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Including the Railroad Gazette and the Railway Age

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CONTENTS

THE condition of the mechanical department equipment on the Illinois Central was radically improved during the fiscal year ending June 30, 1911, as compared to the previous year. At the same time large reductions were made in the cost of maintaining the equipment, as shown on another page. In these days when the motive power officers are doing their utmost to increase the efficiency of their departments the first and natural question is how this was accomplished, for it is a splendid example of practical efficiency engineering. The answer is not hard to find. In 1910 M. K. Barnum was appointed general superintendent of motive power; for over 25 years previous to taking up his new work he had been in the service of the railways and had had a thorough training in the mechanical department. For several years he was general inspector of machinery and equipment on the Chicago, Burlington & Quincy, reporting directly to the vice-president. This experience developed one of Mr. Barnum's strongest traits—diplomacy. Although remarkable results were accomplished by him while he held that position, there was at no time even the slightest friction with any member of the mechanical department. His thorough practical training, which gave him a clear insight into mechanical department problems, coupled with this diplomacy, made it possible when he undertook the work on the Illinois Central to determine immediately what problems were most in need of attention and to quickly gather round him and build up a strong organization. One of the first moves was to increase the supervision. The present scheme of organization must not be considered perfect, for it will undoubtedly be added to and amplified in the future. It must be admitted, however, that it is more complete than the organization of the motive power department of many roads of equal size, and is well worthy of the most careful study and attention.

TWO or three instances have recently been brought to our attention where railways have engaged so-called efficiency engineers to make reports as to how their efficiency might be increased. Fortunately this arrangement covered only the preliminary reports and did not necessitate retaining the engineers after the reports were made. In one case the recommendations were so indefinite, and stated in such general terms, that the officers of the road, after careful study, were forced to the conclusion that they had no practical application. In another case the representatives of the efficiency engineers made very elaborate reports, going into considerable detail, but in only one instance, and that an unimportant one, were their recommendations practical. On the other hand, several defects in the organization and in the shop equipment, which were more or less obvious to the practical men in charge, but which they had not been able to remedy because of lack of funds, were passed over and were not even noticed by the efficiency engineers. There is no question but that there is room for increased efficiency in almost any department of most of the railways in this country, but if real results are to be obtained is it not far better to accomplish them through the regular organization and under the direction of men of long and wide experience in the department which they concern?

A MOST enlightening study of the problem of trespassing on railways is presented on another page by Frank V. Whiting, general claims attorney of the New York Central Lines. Out of 10,396 persons killed on our railways during the fiscal year 1911, 5,284 met death while trespassing on railway property; and of these 4,125 were reported as having been struck by engines or cars, which means that they were walking or standing on the tracks. It has been commonly assumed that most of the trespassers killed are tramps or "hobos," and even railway men will be surprised at the facts given by Mr. Whiting. From an examination of the reports of accidents resulting in the deaths of 1,000 trespassers, he concludes that the great majority are not of the class of aimless wanderers who might be expected to be careless of their lives, but are business or professional men, regularly employed workingmen, and members of their families, whose deaths are a distinct loss to the community. Most of them are people living or working near the railway tracks. Mr. Whiting's figures should be of special significance to lawmakers and local authorities whom the railways have long tried, with little or no success, to interest in the passage of stringent legislation against trespassing or in the enforcement of existing laws. Undoubtedly public authorities have excused to themselves their failure to take steps to keep off railway tracks people who have no business there, on the theory that a majority of those killed are of a kind whose loss is of little consequence, or even a good riddance to the community. Others have been so intent on condemning and regulating the railways, because of the less numer-

ous but more spectacular classes of casualties caused by train or crossing accidents, that they have neglected the much more numerous casualties due to trespassing. Mr. Whiting's demonstration that most of the people killed while trespassing are of a class that is in every way comparable with the passengers and employees killed in train accidents ought to lead to more intelligent co-operation on the part of public officials with the efforts of the railways to reduce this kind of fatalities, which can only be reduced by the passage and enforcement of proper laws.

"IF the average for the last ten years is holding good, fourteen people were killed yesterday while trespassing on the railways, . . . fourteen were killed today; and fourteen will be killed tomorrow." In these words President Miller of the Burlington has put the seriousness of the trespassing problem squarely before the public and the authorities of the thirteen western states traversed by his company's lines in a letter to the governors of those states, which is published in our news columns. Most of the legislation enacted and proposed to promote safety in railway operation by requiring the expenditure of millions of dollars by the roads has for its object the protection of passengers and employees. Mr. Miller shows that there was not a single year in the last ten when the number of trespassers killed did not exceed the total number of passengers killed in all of the ten years, and that the number of employees killed during the period was only two-thirds as great as the number of trespassers. Mr. Whiting has shown that these trespassers are average citizens; yet they are being killed at the rate of fourteen every day, and, as Mr. Miller says, almost no public notice is taken nor concern manifested. Railway men for years have borne the condemnation and abuse that have been heaped upon the roads, because of the size of their casualty lists. Mr. Miller does not mince words in transferring the responsibility for over half of the deaths on railways to where it belongs, viz., to the public authorities who have permitted the conditions which cause these unnecessary deaths to continue by failure to pass and enforce proper laws to prevent walking on railway tracks and stealing rides on trains. Regulation of railways is justified, he says, "but does it not seem that the most important and necessary means of safety lies in the regulation of the public in this indiscriminate use of railway premises?" Mr. Miller has done the railways a commendable service in thus challenging the executives of the western states to a consideration of this vital subject; and the governors will do less than their duty to the public if they fail to respond to his request for their support in abolishing the great nuisance—the great crime might be a more appropriate way to characterize it—of railway trespassing.

THE *Railway Age Gazette* has already (December 8, 1911, page 1166, and January 19, 1912, page 80) pointed out numerous misstatements in the article entitled Speed, attacking the accident record of American railways, which was written by Charles Edward Russell, and published in the *Hampton-Columbian Magazine* for October, 1911. A letter written to G. W. Mingus of Pittsburgh by the chief clerk of the New Zealand state railways discloses that Mr. Russell is as ignorant of or as willing to misrepresent the facts about the railways of New Zealand as the railways of the United States. In his article Mr. Russell said, "in far-away New Zealand an automatic safety device long ago eliminated collisions." Mr. Mingus sent this statement to R. W. McVilly, chief clerk of the New Zealand railways, at Wellington, with an inquiry as to its correctness. Mr. McVilly replied, under date of January 17, as follows:

"Referring to your letter of November 13 last, I have to inform you that the automatic device referred to in your letter is not in use on the railways of this dominion. I understand that some such appliance is in use on one of the Great Western Company's lines in England where it has given satisfaction. If you write to the Audible Signal Company, London, they will, I have no doubt, be glad to send you literature respecting the appliance. The New Zealand railways use Tyer's Automatic Tablet Apparatus, with visual signals, for single line working, the object of the tablet being to prevent two trains from being on the one block section at one and the same time, and it effectually maintains an interval of space varying according to the distance between any two block stations, which is of course determined by the closeness of settlement and the frequency of the train services. The tablet, however, is merely an indication that the road is clear between given points and its possession authorizes the engine driver to proceed between the points which are named on the tablet."

In other words, the system in use in New Zealand is simply a block signal system, and not in any sense an automatic stop system. We have taken the pains to analyze Mr. Russell's article with such detail and particularity, because it is a typical muckraking effusion; and the fact that it has been possible to refute almost every statement of any consequence in it indicates the very limited extent to which the public is justified in relying on the literary productions of him and other writers of his class. Mr. Russell has been more persevering and virulent in his attacks on American railways than any other writer; and analysis of his Speed article shows that nothing that he writes on railway subjects is entitled to the slightest credence or consideration.

THE good of both the railways and the public is jeopardized by the present condition of the rolled and forged steel wheel market. Until some three months ago, the steel wheel makers were getting fair prices for their product. For some reason, known only to those concerned, "war" was declared; with the result that today the alert purchasing agent can buy solid steel wheels at his own price. During February, some of the makers sold rolled wheels at from $3 to $8 a wheel less than cost. That this cannot continue indefinitely is clear. One of two things must happen—either one or more of the companies will go into receivers' hands, or the product will be cheapened. Since solid steel wheels form but a part of the tonnage of at least three of the four concerns involved in the "war," the chances are against receiverships and in favor of reducing the cost of making. And a reduction in cost means an inferior wheel. Followed to its logical conclusion, an inferior wheel means an unsafe wheel—and unsafe wheels mean loss of life and delays to traffic. Situations like this are deplorable and should be impossible. Under our anti-trust law as interpreted to date, the wheel makers are prevented from getting together and settling their differences; but it is to be hoped that a way will be found to correct the evil before the product is made to fit the price.

WHETHER under the Interstate Commerce act as it now stands the federal courts are or are not authorized and required to review the findings of fact of the Interstate Commerce Commission in rate cases is a question that has been mooted for some time. The commission contends that the courts can review its orders only to ascertain if they are unconstitutional because confiscatory. Many refuse to accept this view, and maintain that practically all its orders are subject to judicial review. The law specifically provides for hearings by the commission before any final order can be issued, and that when the commission has found a rate unreasonable it shall fix the reasonable maximum rate thereafter to be charged. It is argued that if the commission makes an adjustment of rates that is not based on the evidence introduced before it, or is not reasonable, the courts must review and reverse the order even if the rates fixed would not be confiscatory. There is no question now regarding the Commerce Court's view of the subject. The commission issued an order requiring the Louisville & Nashville to reduce its through freight rates from New Orleans to Montana, Selma and Prattsville, Ala. The Commerce Court recently annulled the order on the ground that the hearing before the commission was inadequate and the evidence introduced insufficient to support the commission's conclusions. Says the Commerce Court: "The law provides for a hearing, and it must be more than a shadow. Both parties are entitled to be confronted with the evidence on which the case is to be determined, and the con-

clusion reached must be a reasonable inference from the facts disclosed by the investigation." It is desirable that the position taken by the Commerce Court shall be clearly understood. Whether the law *should* make the findings of fact of the commission final, and permit its decisions to be reviewed only on constitutional grounds, is one question. Whether the law *does* make the findings of fact of the commission final and permits the courts to review its findings only on constitutional grounds is an entirely different question. What the Commerce Court has held, relates not to what the law ought to say, but to what it does say. The *Railway Age Gazette* never has believed that, except under a most strained interpretation of the statute, it could be held to make the commission the final judge of the facts. If Congress meant that the courts should review the decisions of the commission only on constitutional grounds, why did it not say so? It was suggested during the debates on the Hepburn act and, subsequently, on the Mann-Elkins act, that the law should be thus framed, and Congress refused to do so. The Commerce Court in reviewing the commission's findings of fact is simply performing a duty which by plain implication is imposed on it by the law, and any criticisms of its interpretation of the law or of its orders under the law should be directed against the body that made the statute and not against the court that merely construes it. Congress is now in session. If the interstate commerce commissioners or any other persons do not like the law as it is and as the Commerce Court says it is, they can go to Congress and ask for its amendment. That would be a great deal more sensible and just than to denounce the Commerce Court for saying that the law means what Congress knew it meant when it passed it and intended the commission and courts to say that it meant.

THE PRESERVATION OF CAR LUMBER.

THE railways of the United States have not adopted the preservation of lumber very generally in the past, largely because it could be obtained at low cost. The principal use of preservatives has been for cross ties. There are many wooden structures along the roadway which are exposed to decay, and the cost of renewal of which would warrant expenditure for the preservation of the more exposed portions. With the advancing price of lumber and of labor, with a larger experience with preservatives and their suitability to various kinds of wood, and with the more general introduction of timber treating plants by the railways, there will doubtless be an extension of the work of these plants to the material in wooden structures.

The life of the underframes of wooden cars is materially reduced by decay, and the strength of the cars is also so reduced that they are often broken and badly damaged in heavy pushing service or rough switching. It is desirable, therefore, to increase the life of wooden cars and maintain their strength by preserving the timber in the underframe and floors. The beginning of this practice will naturally be with the class of cars in which there is the largest amount of decay. The side sills of stock cars require renewal on account of decay after five years' service. The life of the floor is about the same, and that of the center sills is only a few years more. This short service is obtained from Norway pine sills and flooring, which is the kind of wood generally used for this purpose.

The Master Car Builders' charge for car lumber of all kinds, including sills and flooring, is $35 per 1,000 ft. B.M., and each sill requires about 144 ft. of lumber. The labor charge for the renewal of decayed or broken sills is a large item in the cost of car repairs. The Master Car Builders' charge for labor in renewing two side sills is $9.60, and for one center sill $8.40, while the labor charge for renewing all longitudinal sills is $22.56. These figures are higher than the cost at the home shop, but they show what the lines are charging each other for this class of repairs. The cost of two 36 ft. side sills, 5 in. x 9 in., at $30 per 1,000 ft. B.M., is $8.64, and the labor charge for renewal is $9.60, a total of $18.24. The cost of creosoting with 10 lbs. of creosote per cu. ft. is about 20 cents per cu. ft., and the expense for preserving two sills is $4.80. If the life of the sills is doubled by preservation there is a saving of $18.24 — $4.80 = $13.44 at the end of ten years, and it is probable that good lumber properly treated would last the life of the car, or about 15 years, in which case there would be a saving of $26.88 for the side sills alone.

The Burlington is the first line to treat car lumber in large amounts, and it is using the creosote zinc chloride, or "Card," process for the sills and flooring of stock cars. It is now building 1,000 of these cars at the Aurora shops with treated lumber for these parts. The sills are Oregon fir, and the floor is Norway pine; it is treated at the tie plant at Galesburg, Ill. The cost of treating by the Card process is $10 per 1,000 ft. B.M., and the cost for the floors and sills of the stock car is $7. The workmen use mittens in handling the lumber, and wear goggles to protect the eyes when nailing the flooring.

The sills and floor of wooden gondola cars are constantly exposed to moisture, and they are also subject to decay after a short life, and it will doubtless be found profitable to preserve the lumber for this class of cars, also. The preservation of car lumber is a subject worthy of careful investigation, as it may be found to involve almost as many uncertainties, and cause as much discussion, as the economical treatment of ties. The most suitable kind of wood, the character of the antiseptic, and the degree of penetration of the liquid, are some of the facts which must be properly determined to obtain the greatest economy in the new field of lumber preservation for cars. It is true that steel underframes are used for most freight cars now ordered, but they are not suitable for stock cars, as they will corrode rapidly in that service. Wooden flooring is used with steel underframes, and when it is constantly exposed to moisture it should be preserved. The floors of box and refrigerator cars cannot be treated with creosote, on account of its effect on the lading, but it is possible that some odorless antiseptic may be found suitable for this purpose.

EFFECT OF TWO-CENT FARES ON PASSENGER TRAFFIC AND EARNINGS.

ALTHOUGH several state laws reducing maximum passenger fares to two cents a mile have been held unconstitutional on the ground that they were confiscatory, or interfered with interstate commerce, or both, such laws have been in effect in a large number of states for substantial periods—usually between four and five years. The constitutional questions growing out of this legislation are now before the Supreme Court of the United States, and many lawyers believe that they will be finally determined by a decision upholding that of Judge Sanborn in the Minnesota rate case. The number and importance of the states in which two-cent fare laws have been enacted are so large and the direct effect that the establishment of the reduced state fares has had on interstate commerce has been so pronounced that these laws have exerted a strong influence on the trend of passenger business and earnings throughout the country. There is, in consequence, opportunity for an interesting and enlightening study of the effect of two-cent fare laws.

That these laws have reduced the average rate per passenger per mile for the entire country is shown by the fact that it declined from 2.014 cents in 1907, the year when most of the two-cent fare legislation went into effect, to 1.938 cents in 1910, the last year for which the official figure is available. That the reduction has not been greater has been due to the fact that the railways have curtailed the number of special reduced rates made by them.

One of the principal arguments advanced for so drastic a cut as 33⅓ per cent. in the standard fare was that the reduction would so stimulate the growth of passenger traffic that the railways would earn more money by carrying more passengers at the lower rate than by carrying fewer passengers at the higher rate. Spokesmen of the railways contended in reply that busi-

ness would not be increased by a general flat reduction of the standard rate as much as by the roads' former policy of charging three cents a mile for ordinary travel and making special rates for numerous special occasions, usually on the basis of a fare and a third for the round trip, but sometimes as low as one cent per mile for excursions and summer travel. Which side does the outcome show to have been right?

The passenger business and passenger earnings of the railways have increased since the two-cent fare laws were passed. But so have their freight tonnage and earnings; and both have increased more or less steadily, as the country has grown in commerce, in population and in wealth, ever since railways were first built. To ascertain whether the increase in passenger business and earnings has been to any extent due to the reduction of passenger fares from three cents to two cents per mile it is necessary to find out whether the number of passengers carried and the earnings from passenger service have increased more rapidly or less rapidly since the passage of the laws than before. The passenger statistics reported by the Interstate Commerce Commission throw light on this point. As most of the state laws reducing passenger fares became effective in the early part of 1907, for the purpose of ascertaining their effect comparisons should be made between the figures for 1907 and preceding years and those for the later years, 1908 to 1911, inclusive. The figures for 1899-1911, inclusive, are given in the table:

Year.	Number Passengers Carried.	Passengers Carried One Mile.	Passenger Revenue.	Average Revenue per Passenger per Mile.
1911	*1,010,550,527	*33,631,956,182	$658,772,785	....
1910	971,683,199	32,338,496,329	628,992,473	1.938
1909	891,472,425	29,109,322,589	563,609,342	1.928
1908	890,009,574	29,082,836,944	566,832,746	1.937
1907	873,905,133	27,718,554,030	564,606,343	2.014
1906	797,946,116	25,167,240,831	510,032,583	2.003
1905	738,834,667	23,800,149,436	472,694,732	1.962
1904	715,419,682	21,923,213,536	444,326,991	2.006
1903	694,891,535	20,915,763,881	421,704,592	2.006
1902	649,878,505	19,689,937,620	392,963,248	1.986
1901	607,278,121	17,353,588,444	351,356,265	2.013
1900	576,831,251	16,038,076,200	323,715,639	2.003
1899	523,176,508	14,591,327,613	291,112,993	1.978

*Estimated.

During the years mentioned the number of passengers carried nearly doubled. Official figures for the number of passengers carried in the fiscal year 1911 are not available, but the figure for passenger revenues is available, and by assuming the same percentage of increase over 1910 in passengers carried as in passenger revenue, the number of passengers carried is found to be approximately 1,010,550,527. In the fiscal year 1907, the number of passengers carried was 873,905,133. There has been, therefore, in the past four years an increase of 136,645,394, or over 15 per cent. The average increase per year in passengers carried since 1907 has been 34,161,348, or a little less than 4 per cent. Between 1903 and 1907 the increase in passengers carried was 179,013,598, or 26 per cent., which was at the rate of 44,753,399, or 6½ per cent. per year. From 1899 to 1903 the increase was 171,715,027, or 21 per cent., an average of 42,938,756, or 5¼ per cent. per year, which was slightly less than the increase between 1903 and 1907, but still greater than that since 1907. The figures show clearly that the increase in passengers carried has been markedly less since the two-cent fare laws were passed than it was before.

Let us now consider the statistics for passengers carried one mile. Estimating the passenger mileage in 1911 by the increase in earnings officially reported, we find that passengers carried one mile increased from 27,718,554,030 in 1907 to 33,631,956,182 in 1911, or 5,913,402,152. This is an average increase per year of 1,475,850,533. The percentage of increase in the four years is 21, and per year 5¼. Comparing the figures for 1907 with those for 1903 we find an increase of 6,802,790,249, or 33 per cent.; an average per year of 1,700,667,562, or 8¼ per cent. From 1899 to 1903 the increase was 6,324,436,268, or 42 per cent.; nearly 11 per cent. per year. The increase in passengers carried one mile also has been less since the two-cent fare laws were passed than it was before.

In 1911 the revenue from passenger service was $658,772,785; in 1907, $564,606,343; in 1903, $421,704,592; and in 1899, $291,112,993. Therefore, during the past four years the increase has been 16⅔ per cent.; during the preceding four years it was 33⅓ per cent., and during the four years before that—1899-1903—it was 44 per cent.

The unmistakable conclusion from these figures is that two-cent fare legislation has not tended to increase either passenger traffic or passenger earnings. What increase there has been has been caused by the natural development of the country and the increase in population. In fact, the figures furnish evidence that instead of stimulating the growth of railway travel the two-cent fare laws have rather retarded it. Railway men have learned by experience, not by theorizing, that the amount of travel at a particular time or between particular points for a particular occasion may be greatly stimulated by a specific and temporary reduction in rates, but that ordinary, day-to-day travel for business or pleasure, which makes up the bulk of railway passenger business, is controlled by other considerations to a far greater extent than by a difference of a cent a mile in the standard fare. Nobody will do any more of such traveling, because the regular rate is two cents than because it is three cents or four cents. On the other hand, almost anybody may be induced to attend a convention, make a shopping trip or take a vacation tour by a temporary reduction in rates. It is the reduction of fares for special purposes and limited periods that stimulates traffic.

Moreover, the railways have learned, also by experience, that this latter class of traffic increases net as well as gross earnings. The unit of cost of passenger service is not the passenger mile, but the train mile. If trains which ordinarily run half empty can be filled by a reduction of fares for an excursion, the expense of transporting the increased number of passengers is not increased in proportion; and the proportion of the receipts left for net earnings is enhanced. When regular fares were three cents a mile there was a basis from which reductions could be made. When the basis was reduced to two cents, on the theory of equal rates to all at all times, there was nothing to reduce from without cutting much below what the railways felt they could in any case afford. Therefore, the roads, instead of making special rates to induce extra travel, have resorted to seeking to stimulate travel by special service and more luxurious trains, which, of course, have increased expenses. Another reason why they have maintained the flat two-cent rate is that it would have seemed inconsistent to contest the two-cent fare laws while in practice making lower rates. Furthermore, they have been restrained by the effective, though fallacious, argument advanced by those who were responsible for the two-cent fare laws, that if railways could afford to cut rates to two cents or less for special occasions they could do so at all times. If the roads were to cut rates below two cents a mile, how long would it be before those who caused the passage of the two-cent fare laws would start an agitation for a 1½-cent fare?

As passenger business is relatively unremunerative at best, when its fair proportion of fixed charges and overhead expenses is added to the direct operating expense of handling it, the carriers cannot be blamed for declining to make many rates below the legal maximum so long as that maximum is two cents a mile.

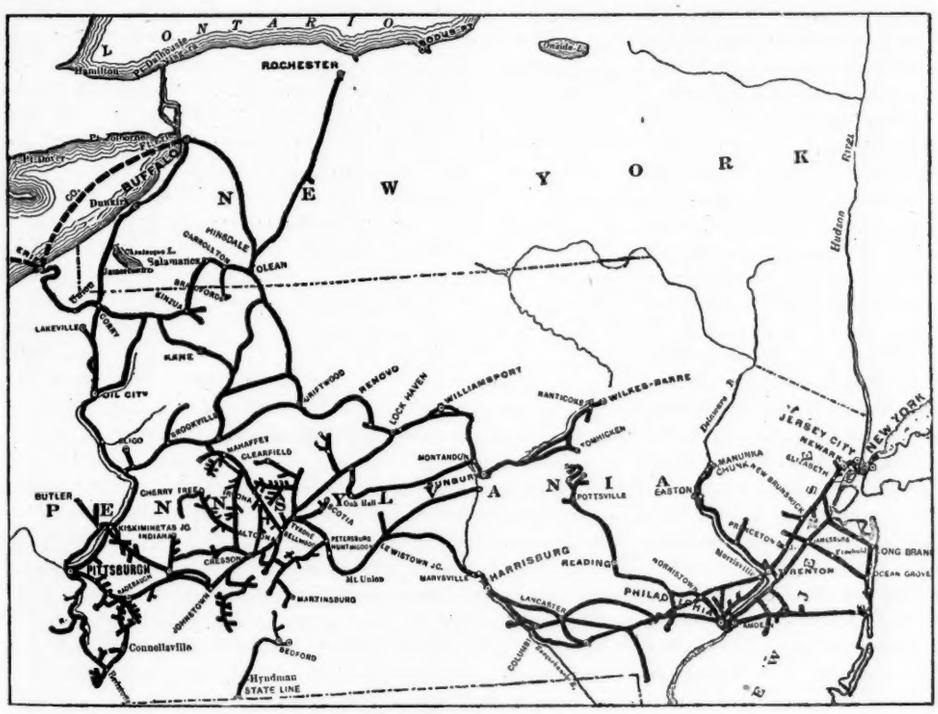
PENNSYLVANIA RAILROAD.

A FAIRLY good illustration of the policy of the Pennsylvania Railroad towards the financing of the betterment of its property is afforded in a little table published in the annual report for the calendar year 1911. This table shows that during the year the company spent for additions and betterments and equipment $14,320,000, of which $6,970,000 was spent from income of this year and previous years; $1,790,000 from depreciation reserve, and $5,560,000 from the proceeds of the sale of securities (charged to capital account). An even more impressive illustration of the company's determination to keep its capital account on the soundest possible basis is given in its treatment of the cost of the New York terminal. The Pennsylvania has advanced $84,860,000 for the tunnels and station and in exchange received a certificate of indebtedness of the Pennsylvania Tunnel and

Terminal for their amount but carries this $84,860,000 certificate on its books at $57,460,000.

The necessity for such a conservative policy, both as regards financing and as regards operation, is not shown on the face of the figures for earnings and expenses of the property. In 1911 the five grand divisions, operating 4,018 miles, earned a total revenue of $157,490,000, a decrease of $2,970,000 from 1910, and showed net operating income, after the payment of taxes, of $35,900,000, a decrease of $2,050,000. Since fixed charges were reduced, as is mentioned later, by over $1,000,000, the sum available for dividends was $37,320,000, or only $460,000 less than in 1910.

The Pennsylvania Railroad, operating as it does between such important manufacturing centers and the Atlantic coast, reflects in its net earnings quite accurately the industrial conditions of the country, and even in a year of great industrial depression, it has its large tonnage of both anthracite and bituminous coal to depend on as a steady revenue producer; in addition it has its passenger business, which in 1911 brought in $8,450,000 from passengers alone, an increase of $290,000 over the year before,



The Pennsylvania Railroad.

which is, to a large extent, independent of industrial conditions and which grows with increase in population.

The explanation of the necessity for thoroughgoing conservatism on the part of the management lies in an understanding of the enormous pressure under which the plant, as well as the officers, is put to meet the service required. One of the very large transcontinental western railways handled in a recent year 7,013,000,000 ton miles of freight. In 1911 the Eastern Pennsylvania *division* of the Pennsylvania Railroad, which comprises, roughly, only the lines between New York and Philadelphia and Altoona, handled 9,314,000,000 ton miles. The western road had two general managers, with their full staffs, and had 9,900 miles of railway to spread the business out over, while the Eastern Pennsylvania division had a general superintendent and 1,341 miles of railway. If the objection is made that the Pennsylvania has a great deal of four-track line, it is proper to reduce the comparison to a track mile basis, including sidings. On this basis the Pennsylvania handled nearly a third more ton miles over 3,534 miles of tracks than the western road handled over 13,674 miles of tracks. This comparison is given only to show how intense and how concentrated is the pressure on both officers and plant of the Pennsylvania.

The Pennsylvania east of Pittsburgh has on an average a locomotive to every mile and a quarter of road. It is a property worked to within a comparatively small per cent. of its absolute total physical capacity. A comparatively small per cent. of increase in freight and passenger business may necessitate the expenditure of vast sums for new facilities. It is not surprising, then, that those responsible to the public which such a property serves, and to the great body of holders of its securities, have adopted and perfected a policy of thorough-going conservatism.

An organization that can successfully operate under such conditions as those on the Pennsylvania Railroad must be founded on something more enduring than the genius of any one man. Its service requires almost a military standard of attention to duty, and its management must inspire in employees a confidence in the permanency of working conditions that is generally absent from American railway service. Its management must inspire in the officers a sense that their work will receive the appreciation and eventually the promotion which it deserves. The organization has to be built up over a long service of years. Such an organization is the ideal which the Pennsylvania Railroad tries to attain. The requirements of a plant to meet conditions of such great pressure will be mentioned later.

Returning to the figures shown by the company for the calendar year ended December 31, 1911, operating revenue, as has already been mentioned, was less in that year than in 1910. A decrease of $4,020,000 in freight revenue was partly offset by an increase of $840,000 in passenger revenue.

Operating expenses totaled $113,230,000 in 1911, a decrease of $1,580,000 from 1910. The saving in expenses, however, came entirely in maintenance cost, except for a slight saving in traffic; the cost of transportation totaled $58,050,000 or $850,000 more than in 1910. The fact that transportation expenses increased is explained by the comparative character of the traffic in 1911 and 1910, and by the fact that the increased wage scale was in effect only for eight months in 1910, while in 1911 it was in effect for the entire calendar year.

The ton mileage on all the lines directly operated was 19,428,000,000, a decrease of 4.24 per cent. from 1910. On the other hand, passenger mileage totaled 1,722,000,000 in 1911, an increase of 1.70 per cent.; and the fact that sleeping, parlor and observation car mileage increased 8.97 per cent. suggests in what class of passenger traffic the new business largely occurred. With an increase of 4.24 per cent. in the ton mileage, revenue freight train mileage actually decreased 7.37 per cent. In other words, while revenue per ton per mile remained almost the same, at 5.87 mills, revenue per freight train mile increased by 4.18 per cent. and totaled $3.942.

Passenger mileage increased by 1.70 per cent., and passenger train mileage increased by 5.72 per cent. Increased operating efficiency can, to some extent, decrease passenger train mileage per passenger mile, but it almost invariably meets with opposition from the traveling public and is generally recognized by railway men to be so counter to public sentiment as to be inexpedient.

The very distinct gain made in handling freight was apparently due to better train loading and to other economies and improve-

ments in operation. In 1911 the average train load of revenue freight was 671 tons, an increase of 22 tons, or 3.4 per cent.; and when it is taken into consideration how very heavy the average load is on the Pennsylvania this gain means a great deal. Locomotive mileage in freight service totaled 36,970,000, a decrease of 6.36 per cent.; and locomotive mileage in switching service totaled 21,750,000, a decrease of 7.67 per cent. The average haul of freight on the Pennsylvania was 155 miles, or only slightly less than in 1910. The gain in train loading was due to an increased number of cars per train, the loading per car being 26.59 tons in 1911, or 0.23 of a ton less per car than in 1910.

Of the total tonnage, amounting to 125,180,000 tons, carried on the Pennsylvania in 1911, 42,170,000 tons were furnished by bituminous coal, 11,740,000 tons by anthracite coal and 12,360,000 by coke. The increase in bituminous coal tonnage was about a million tons, and the anthracite coal tonnage about a quarter of a million. Coke, however, was less by 2,150,000 tons than in 1910. There was a notable decrease in the tonnage of bar and sheet metal, which tonnage totaled 3,850,000 in 1911, or over 1,000,000 tons less than in 1910.

In the spring of 1911 the Pennsylvania Railroad offered to its stockholders $41,260,000 stock at par, which was subscribed for. With the proceeds of this stock sale the company reimbursed itself for the sum spent in 1910 to pay at maturity general mortgage bonds and short term notes. The payment of these fixed interest bearing securities made a saving in the year 1911 of $1,020,000 in interest charges for funded debt. The Pennsylvania also, through its sale of stock, very materially strengthened its holdings in cash. At the end of 1911 there was $51,080,000 cash on hand, an increase of $18,720,000 over the amount on hand at the end of 1910. The Pennsylvania also increased its holdings of Norfolk & Western common stock and of New York, New Haven & Hartford stock. The total par value of Norfolk & Western common held at the end of 1910 was $31,660,000, and at the end of 1911, $32,480,000, while the par value of New Haven stock was $3,500,000 at the end of 1910 and $4,060,000 at the end of 1911. There is no indication in the annual report that the Pennsylvania Railroad itself has been buying Seaboard Air Line stock, as was rumored at times during the past year.

It has been customary to say that the Pennsylvania has not had under consideration since the completion of its New York terminal, any plans for very great extension of its facilities. This is by no means correct. The New York terminal had not been finished before the business at Philadelphia made pressing demands for large additions to facilities at this city. The Pennsylvania has also been at work jointly with the New Haven on the very important and expensive New York connection. Last year the directors and a committee of officers of the Pennsylvania worked at devising some method by which the situation at Philadelphia could be improved. They considered, among other things, taking a great deal of the through business away from the Broad street station, but probably such a plan met with a good deal of bitter opposition, and at the end of the year the board of directors had about concluded that the passenger facilities would be improved by increasing the tracks and platforms and enlarging the station facilities at the Broad street station and at North Philadelphia. The freight situation is to be improved by building two additional tracks so as to make a six-track system between Paoli and Philadelphia. Between Morrisville, Pa., and Newark, N. J., there are also under construction two additional tracks. The line between Paoli and Philadelphia will benefit Philadelphia, and the other new line will be used for New York traffic.

The Pennsylvania now has six tracks in operation all the way from Pittsburgh to Philadelphia, with the exception of the stretch on the Middle division, between Pittsburgh and Harrisburg. Possibly an outline of how the six-track road between Harrisburg and Philadelphia is operated will give as clear an idea of what the Pennsylvania is now doing, and what it may expect to have to do as can anything else. The four old tracks are used for passenger trains and fast freight trains. They are used even now at certain times of the year almost to their full physical capacity. The two-track low-grade freight line has a 0.2 per cent. grade. It is used only for slow freight, almost entirely coal, and for the westward movement of empty freight cars, mostly steel hopper cars. At busy seasons of the year 30- to 40-car trains of coal follow each other eastward over the line as closely as safety will permit. Notwithstanding the extraordinary density of traffic over this line, it is estimated that it probably does not pay the interest charges on its cost of construction; yet it was absolutely necessary. The service demanded on the old four tracks was so great that two additional tracks on the same grade would not have satisfactorily taken care of the business offered.

There is here a rather good illustration of a case where a railway company, in meeting the demands of its service, has to make an expenditure which cannot carry itself from its net earnings. The problem is obvious; the solution will have to be left to the future.

The following table shows the principal figures for operation in 1911 as compared with 1910:

	1911.	1910.
Mileage operated	4,018	3,977
Freight revenue	$113,414,431	$117,434,920
Passenger revenue	33,525,583	32,687,423
Total operating revenue	157,587,413	160,457,298
Maint. of way and structures	18,353,290	20,342,489
Maint. of equipment	30,579,967	31,117,989
Traffic	2,143,147	2,221,803
Transportation	58,046,751	57,200,886
Total operating revenue	113,228,393	114,812,628
Taxes	6,826,070	6,374,736
Net operating income	34,390,637	35,782,656
Gross corporate income	51,617,111	53,241,503
Net corporate income	37,318,551	37,775,484
Dividends	25,950,857	24,410,860
Reserved for additions and betterments	4,000,000	3,700,000
Extraordinary betterments and improvements	2,265,887	3,504,597
Principal of equipment trusts	3,076,853	3,418,658
For the trust of October, 1878	319,756	308,522
Surplus	1,704,997	2,753,396

NEW BOOKS.

The Signal Dictionary. McGraw-Hill Publishing Co., New York. 9 in. x 12 in. 566 pages. 3,899 illustrations. Leather, $6.00; Cloth, $3.50.

The Railway Signal Association Signal Dictionary, first published in 1908, has been revised and published in the second edition under the supervision of a committee of the association.

The aim in revising the book, as stated in the preface, has been to "retain descriptions and illustrations of apparatus which, although no longer made, is and will remain for some time in rather extensive use, as well as to reflect the latest work of the manufacturers." That the book is not merely a catalog of manufacturers' devices is shown, however, by the fact that it contains practically all of the standards of the Railway Signal Association and a great many standards adopted by the signal departments of prominent railways of this country and England.

Another change which will be found almost as valuable as the addition of up-to-date apparatus and standards is the rearrangement of the material in a form which is intended for ready reference. The definition section, or dictionary proper, was amplified considerably with special attention to the terms used in connection with alternating current apparatus, and the whole section was revised and brought up to date. All definitions which can be illustrated by the figures in the descriptive part of the book are referred to by their figure numbers. The descriptive part of the book is divided into five sections, which are clearly marked by title pages and subdivided to arrange each branch of the subject under distinct headings, and a complete cross reference index is added. The divisions of the descriptive part are: (1) Signal Symbols and Signal Indications; (2) Block Signaling; (3) Interlocking; (4) Highway Crossing Signals, and (5) Accessories. The last-named division contains 18 subdivisions, in which the apparatus and devices used in railway signaling are illustrated and described.

Letters to the Editor.

EXCESSIVE SPEED AND RAILWAY ACCIDENTS.

Chicago, February 26, 1912.

To the Editor of the Railway Age Gazette:

Is it not strange that our Congress, after legislating to itself the almost unlimited physical regulation of the railways, should confine so much of its activities to surface remedies for the prevention of passenger train accidents?

Why should Congress not go to the root of the subject, and by thorough investigation endeavor to discover whether the fundamental cause of accidents may not be unreasonably fast train schedules? Would it not be well for Congress to investigate each species of accident and learn how many are the direct result of, or connected with, excessively fast schedules? A careful study of the facts by Congress might compel the conclusion that excessively fast schedules are the fundamental cause of accidents.

May not Congress investigate the social and business necessity for excessively fast schedules? If it should be found that fast schedules exist for the benefit of but one in one thousand traveling patrons, this might justify the conclusion that the remaining 999 traveling patrons should not be subjected to the risks which investigation may show attend excessively fast running.

Investigation may convince Congress that it is far from the root of the subject, in making laws to compel the railways to adopt devices of which the most that can be said is that they are still in the most experimental stage, with the expectation that these delicate, highly mechanical, electric and uncertain mechanisms will come into play at the providential moment and avert the consequence of the temporary mental lapse of an engineman.

Is there not much which the railways can and should do and will do to safeguard transportation, of greater value for safety, which should precede the proposed requirements? Is it not within the province of Congress to investigate and learn what proportion of the serious accidents between two trains and in derailments and the giving away of equipment in the last few years, has occurred to trains running on long distance schedules at a speed of rate of over 40 miles per hour?

Congress might learn what proportion of accidents has occurred to trains on fast schedules running late and running fast to make up time. What proportion has occurred in instances in which the anxiety of capable, unexceptional enginemen to make up time, has caused them to overlook the language of incessant block signal indications? What proportion has occurred through failure of equipment on excessively heavy trains, hauled by excessive engine power on excessively fast time? What proportion has occurred from broken rails, largely attributable to fast time and heavy power? What proportion has occurred through the haste and hurry of train despatchers, signalmen and operators to facilitate the movements of fast trains and who have been led, in their anxiety, to violate rules laid down for safety, for the sole purpose of expediting the movement of the trains?

These are some of the principal classes of accidents resulting from fast time. Congress may not be able to regulate the rate of speed of railway trains. It might, however, do a beneficent work by investigating the effect of fast time and calling the attention of the public and the railways to the consequences, which so frequently result from it; and if it concludes that fast time is a largely contributing cause of accidents, it might call attention to its investigation and give publicity to its views.

Congress could not do more towards conserving the life of railway travelers than by calling attention in a persuasive way to the damaging consequences of fast time, after having made careful investigation and analysis of passenger train accidents for a reasonable period.

It would seem to be more the duty of Congress to make these investigations for the discovery of the fundamental cause, than to ignore the fundamental cause, on the ground that fast running is an indispensable necessity, and proceed in an impracticable and haphazard way to compel the use of expensive and inadequate devices for hedging against the consequences of such running.

If Congress could induce the railways to establish rates of speed of 25 and 35 miles per hour between long distance terminals, the lives of many who are now killed would be saved, and the lives of many who are not killed would be greatly prolonged by the comfort and pleasure of safer travel. Steel cars may prevent some loss of life in collision and derailing accidents, but who wants to take the chances in these accidents of having his life saved, at the risk of possible permanent injury in a steel car? Who would not prefer to so travel as to avoid the occurrence of accidents?

Let Congress make the suggested investigations before resorting to legislation, which seems to practical railway men to invite more danger than it can contribute toward safety.

Nothing could mark so great a stride towards safety as an authoritative recommendation by Congress to the railways that they slow down their fast schedules and that proposed legislation would be withheld pending a fair trial of the result of the change. Very many of our railways are composed very largely of branch mileage. Undoubtedly all superintendents will recall that since the construction of these lines embracing periods of from 20 to 50 years, on which schedules range between 20 and 25 miles per hour, the life of no human being has been taken and no human being has been injured by train accident.

It should be respectfully recommended to the committees of the two houses of Congress and the Interstate Commerce Commission, that the different bills now in their hands requiring the installations of different signal and automatic devices be withheld until the necessity for them can be investigated and their practicability can be established; and that if legislation must finally follow that it take the form, not of an inflexible law to be applied everywhere without regard to conditions, but of a flexible law giving due consideration to the financial ability, physical conditions, density of traffic and speed requirements of the various lines.

Congress should also be invited to ask for the assistance of, and take into its confidence the active railway men who have helped build up and are now operating the roads. The advice and judgment of these men should outweigh the advice of inventors, promoters and others, who without the actual experience and responsibility of railway operation, will for the sake of selfish speculation, urge upon Congress its legislative sanction of untried devices—devices, which to the present time are based on theories, and whose use would be full of risk. Our railways have not been built up to their present high standard of excellence by acting on the advice of such men. The good intentions of our Congress should take the form of action slowly, and by careful encouragement the railways should be assisted by helpful advice rather than coerced by compulsory legislation.

A committee or commission appointed by Congress to investigate and recommend to the railways the results of its studies would undoubtedly meet with the co-operation and conscientious support of the railways, because of the practical purpose in view and the candid manner of reaching the desired ends. The most influential bodies of men connected with government have often been found with authority only to investigate and recommend. The Massachusetts Board of Railway Commissioners is a striking example of a body, whose only authority is that of recommendation. It is frequently stated that this recommendatory commission is of greater influence than any other authoritative commission in the Union.

If Congress were to proceed under the advice of an unbiased and non-political agency, the railways which are to be regulated would undoubtedly be found most cordial assistants, rather than apparent obstructionists.

Nothing is more strongly felt by the railways than the inade-

quacy of the present method of introducing bills vitally affecting the operation of the roads, which are referred to the commerce committees of the houses, which at most can be given but perfunctory hearings to a small number of representatives of the railways, necessitating conclusions reached without due information and deliberate consideration.

F. C. RICE,
General Inspector of Transportation, C. B. & Q.

UNRESTRICTED USE OF THE "19" TRAIN ORDER.

Needles, Cal., January 16, 1912.

To the Editor of the Railway Age Gazette:

The subject of improving train service merits serious consideration. While we have made fairly satisfactory progress with passenger traffic, there is continual dissatisfaction regarding the movement of freight. The traffic department is constantly urging upon the operating department the necessity for perfecting and quickening the transportation service. At the same time, the ever present necessity for rational economies must never be lost sight of. It therefore behooves railway officials to make the best possible use of the facilities and methods at their command.

On railways where the "31" train order is still in vogue, much delay to trains, both passenger and freight, is occasioned by the necessity of stopping trains for orders, requiring conductors to go to the telegraph office, sign for the orders, read them aloud to the operator, take the orders to the engineman, have him read them to the conductor and then give the conductor a receipt for the orders received. It costs money to stop and start trains. Much time is lost by the procedure made necessary by strict compliance with the rules for handling the "31" train order. Every stop which can be obviated and every minute of time that can be saved means money to the company. One of the most important requisites of the train order system is to get the order into the hands of the men who are to execute it. And the less hands the order is obliged to pass through between the despatcher and the men who are to execute it, the less possibility of failure. With the "19" order only one man handles the orders between the despatcher and the conductor and engineman. Some roads have long since adopted the unrestricted use of the "19" order and have pronounced it an absolutely safe and practical method, as well as economical. It is safer than to use the "31" order. This assertion is based upon actual experience.

Officers of those roads which have adopted the unrestricted use of the "19" order tell us that they have yet to hear of a single accident in any way traceable to the use of the "19" order, or that might have been averted by the use of form 31.

Timid, indeed, were the first experiments. An extra safeguard was thrown around the despatching system by the installation of automatic block signals. The step was watched with much interest. It was found to work satisfactorily, and while the automatic block signals served to stop trains in case something happened to create a hazard, it was found that trains were being handled in such a manner with the "19" order that the system did not depend on the block signals for its success. No hazards occurred that could have been obviated had a "31" order been used instead.

So other roads took up the practice—roads having no block signals. First, they authorized the unrestricted use of the "19" order for freight trains only. A year or so later, authority was given to use the "19" order for both passenger and freight trains. This system has been in vogue during the past three or four years on one of the busiest roads east of Chicago; and on four of the divisions on which it has been in use, every mile of which is single track, not one mile has automatic block signals or block signals of any kind. And they tell us the same story; not a single oversight or mishap of any kind has occurred which could be charged to the order system.

What better recommendation could one ask than the results of four years' experience on this single-track road? It has been said that we are living in an age of progress. If this be so, is it not time for some of the other progressive roads to take a step in the march of progress and discard the use of the "31" train order and adopt the unrestricted use of the "19" order?

It is one of the best methods of keeping the wheels of freight trains moving, and is an improvement in safety. And in asserting that it is a safer method, let me tell of a few specific hazards which actually occurred by reason of the "31" order having been used, which could have been obviated by the "19" order:

A light engine going over a division in charge of the engineman, fireman and a flagman, pulled into a station. The train order signal indicated "stop." The engineman pulled by slowly and stopped at the water tank a few hundred feet away. The fireman took water. The engineman got down and oiled around, and chatted with the flagman. A few minutes later, they got aboard the engine and started off, forgetting all about the signal having been displayed for orders. The operator thought the engineman would come back after having looked his engine over and made no effort to attract his attention, and the engine had gone before the operator knew it. If this had been a "19" order, the operator would have been out and handed it up to the engineman as the engine passed his office, and the hazard would not have been created.

A long freight train pulled into a station. The train order signal was displayed. The train stopped and the conductor went to the office and signed for the order. The head brakeman also dropped off and went in with the conductor. The conductor gave the brakeman a copy of the order to take to the head end, gave the usual "high ball," and they left town. On the way to the head end, the brakeman became involved in a quarrel with some tramps, and considerable time was lost in putting them off the train. In the meantime, the order was stuffed into his pocket and the train had passed the point where they were to have met another train before the brakeman thought of the order. The engineman had not thought to ask him for it, and the conductor was busy making out reports and had not noticed the oversight until they had passed their meeting point. The order on a "19" form could have been handed up by the operator, the necessity of stopping the train would have been avoided, and this hazard would not have been caused.

A passenger train pulled into a station—the train order signal was against it. The crew did their station work and pulled out. The operator expected the conductor to come in and sign the order. The conductor and engineman both overlooked the signal and afterward claimed that it was clear. Others substantiated the statement of the operator that it was "red." If the order had been on a "19" form, the operator would have been out and handed it up; and this hazard, as well as the dispute as to the position of the signal would have been obviated.

A despatcher sent a "31" order to an operator for a passenger train, changing a meeting point. It restricted the rights of this particular train. The operator failed to display his signal and did not notice the oversight until the train was speeding by his office. He was so surprised and bewildered that he could not think of rushing out with his red light until the train had passed the office, and then he was unable to attract the attention of any one on the train. In this case a collision occurred and many lives were lost. If the "19" form of order had been used, the operator would have been on the alert listening for the coming of the train and been out where he could have at least tried to deliver the order. No doubt he would have noticed the position of the signal in time to change it or to flag the train with his lantern.

In a certain case two freights met on the main line, because the despatcher blundered in giving directions which train should take the siding. He sent the order to one train, an extra, to be delivered at the meeting point. If the order had been on a "19" form, he would have given it to the extra at the first open telegraph office, and this hazard would not have been caused. He did not want to delay the train by making an unnecessary stop for the order.

All these oversights, of course, are what you might call "man failures," and were not entirely the fault of the "31" order. But a system which leaves so many loopholes for trouble as does the "31" order, should not be continued when it has been proved beyond a reasonable doubt that the opposite method, the unrestricted use of the "19" order, is a safer and more practicable method of handling trains as well as by far a more economical one.

It means a better and quicker service by avoiding the necessity of stopping trains for orders. It means fewer trains tied up in compliance with the 16-hour law. It means less work on the part of the train despatcher, operators and conductors. All this will tend to lessen the cost of operation. It means better movement of freight traffic—more business for the company. Reducing the number of stops means less drawbars pulled out and less damage to freight by rough handling.

One of the safeguards in connection with the use of the "19" order lies in the form of clearance card to be used, on which the operator is required to write the numbers of all train orders for delivery to the train, and repeat the numbers to the despatcher from the clearance card. If it is found that these are all the orders intended for the train, the despatcher gives the operator O. K. This gives the despatcher a check on the delivery of all orders.

The unrestricted use of the "19" order is no longer an experiment. The test has been made. The results are highly satisfactory. Let us pull for its universal adoption.

J. P. FINAN,
Train Despatcher, Atchison, Topeka & Santa Fe.

SPARK LOSS FROM LOCOMOTIVES.

URBANA, Ill., February 27, 1912.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In your issue for February 23 you present under the caption of "Tests in Smoke Abatement on Santa Fe Switching Locomotives," a very complete abstract of a report made by J. H. McGoff, mechanical superintendent, and H. B. McFarland, engineer of tests, on behalf of the Atchison, Topeka & Santa Fe.* The report describes experiments conducted by Mr. McFarland to determine the amount of solid matter discharged from the stack of a switching locomotive operating during the year on the Atchison, Topeka & Santa Fe in Chicago. After presenting certain results, the report proceeds as follows:

"These figures as to the cinders thrown from the stack in switching service discredit the popular theory of great heat losses due to cinders passing out of the stack. In Goss's 'Locomotive Performance,' figures are given for laboratory tests under various working conditions showing losses in the form of cinders passing out of the stack varying from 2.8 per cent. to 10 per cent. of the total coal fired. The results of the tests on engine 2024 in the Chicago yards show but 0.82 of 1 per cent. of the total Pocahontas coal fired passing out of the stack in the form of cinders."

Mr. McFarland's implication to the effect that his results discredit those which have been published by me is an unfortunate one. That there is lack of agreement seems obvious, but the fair-minded critic will prefer to weigh the evidence before deciding which set of results is to be discredited.

The statement as presented by me in the book, "Locomotive Performance,"† and which Mr. McFarland questions, includes results from seven formal tests made on a locomotive plant *under constant conditions of running*, each test being at a different rate of power. The results of these early tests have been confirmed by many subsequent tests. For example, a book entitled, "Superheated Steam in Locomotive Service,"‡ gives the spark losses occurring in 18 tests under different conditions of operation, the values of which must be nearly right, since those of each test enter as a factor in the determination of a heat balance covering the entire performance of the boiler. They show, with Pocahontas coal as fuel, results substantially as follows:

Draft, inches of water	Pounds of coal per hour	Pounds of water evaporated per foot of heating surface per hour.	Solid matter caught in smoke-box and discharged from stack per cent. of weight of fuel.
1.5	750	6	4.3
2.2	1,010	8	8.0
3.0	1,333	10	12.0
4.2	1,777	12	17.5

It will be evident from this statement that the extent of the spark loss depends on the rate of power at which the locomotive is worked. Mr. McFarland's statement shows that his locomotive was often running light, that its runs were always of short duration, and that it was sometimes standing still. The average power developed is indicated by the amount of coal burned which, when Pocahontas coal was used, is stated to have been 386 lbs. per hour, or 13.2 lbs. per ft. of grate per hour. This rate of combustion is from 1/10 to 1/15 that which is common in locomotives on the road. It is less than half that employed by me in a locomotive having a boiler half the size of that carried by his locomotive, in the lightest power test for which the spark losses have been determined. Applying my results to the conditions reported by Mr. McFarland, it becomes evident that the average draft value in his tests must have been much below 1 in. of water. My estimate is that it was about ½ in., and I estimate also that the spark loss which is normally to be expected under the conditions he reports, is about 1¼ per cent. of the fuel burned. His work shows that the spark loss was less than 1 per cent. Passing by this discrepancy for the present, I must insist that Mr. McFarland is wide of the mark when he undertakes to show the normal fuel loss through stacks in locomotive service by the use of a switch engine burning less than 400 lbs. of coal per hour when normal engines on the road having boilers no larger than that of his switch engine are consuming 4,000 or 5,000 lbs. per hour. It is entirely gratuitous to employ the results of such tests to discredit those obtained from carefully planned experiments, all the conditions of which have been specified.

The fact that Mr. McFarland's results show about one-half the cinder loss which might have been predicted from results obtained by me, and the fact that the sparks collected possessed a lower heating value than I have reported, is, I think, easily accounted for. He collected the sparks in a centrifugal separator about 30 in. high through which he drew approximately 11 per cent. of the total volume of gases discharged by the stack. This stream of sampled gases found its escape through a center opening in the separator 10.5 in. in diameter. The trouble with this arrangement is that the sample is too large, or the separator is too small. I have found it desirable to reduce the area of the sampling tube to about 1 per cent. of the area of the stack and to have all openings in the receptacle in which the sparks are collected covered by fine brass (milk strainer) gauze. In the light of my experience, it seems clear that Mr. McFarland did not catch all of the solid material entering his separator. The larger and heavier particles, which were well ballasted with ash, stuck, while many of the smaller and lighter coke particles passed through, with the result that the total solid matter collected was less than it should have been and the heating value of that which was colleced, lower.

W. F. M. GOSS,
Dean, College of Engineering, University of Illinois.

*The report was issued by the Chicago Association of Commerce Committee of Investigation on Smoke Abatement and Electrification of Railway Terminals, Bulletin VI.

†Published by John Wiley & Sons.

‡Published in 1910 by the Carnegie Institution of Washington.

The parliament of Tasmania has voted $145,800 for extending the railway from Hobart westward to Russell Falls, 20 miles farther to the settlement of Tyenna. This will open up a rich timber country and also several agricultural valleys. It is intended ultimately to further extend this railway to the west coast of Tasmania, where there is considerable mining for copper, silver and lead. The proposed route beyond Tyenna is through country entirely unsettled, heavily timbered much of the way, and supposed to contain valuable minerals.

PRACTICAL EFFICIENCY ENGINEERING.

A splendid record in improved mechanical department efficiency has been made on the Illinois Central within the past year and a half, as may be seen by studying the following table containing data as to the cost of maintaining freight and passenger cars and locomotives for the fiscal year ending June 30, 1911, as compared with the previous year.

Cost of Actual Repairs to Cars and Locomotives.

	Freight Cars.		Passenger Cars.		Locomotives.	
	1911.	1910.	1911.	1910.	1911	1910.
Number owned, June 30	60,824	62,705	995	945	1,447	1,398
Repairs, total cost	$5,715,107.34	$8,403,146.00	$878,859.90	$946,033.00	$4,812,649.46	$4,632,412.00
Average cost per car or locomotive	$93.96	$134.01	$883.28	$1,001.00	$3,325.95	$3,313.60
Total mileage	616,886,368	593,266,334	82,135,749	47,051,906	47,051,906	45,893,235
Cost per mile (cents)	0.926	1.417	1.070	1.182	10.23	10.094

The above figures cover the actual cost of repairs and do not include depreciation and renewals. The cost of repairs to freight cars was reduced $2,688,038 during 1910-11 in spite of the fact that a 6 per cent. increase in the wages of all shop men took effect during the last month of the fiscal year 1909-10. A considerable improvement was also made in the condition of the cars, the number of bad order cars being reduced from over 10,000 in July, 1910, to less than 3,000 on October 31, 1910. A large number of heavy repair cars, some of which had been waiting to be shopped for two or three years, were rebuilt during the fiscal year of 1910-11. It is thus clearly apparent that the reduction in the cost of repairs to freight cars from $134 to $94 per car was not brought about by allowing the equipment to deteriorate; in fact it was really in far better condition on June 30, 1911, than at the close of the previous fiscal year. About 2,000 old freight cars were dismantled during 1910-11, because of having outlived their profitable life and the difference between the inventory value and the scrap value was charged to renewals of freight cars.

The total cost of repairing passenger cars decreased $67,000. The decrease of $118 per car is more than it would have been, but for the number of new cars which were received during 1910-11, but, on the other hand, leaving the new cars out of consideration, there was a substantial improvement in the condition of the older equipment as compared with the previous year.

Locomotive repairs show an increase of $100,080 for 1910-11, as compared with 1909-10, but there was a good reason for this. On June 30, 1910, there were about 45 locomotives awaiting general repairs, and all of these were put through the shops within the next four months, and on November 1, 1910, there were 85 more locomotives in service with the same number owned, as compared to the same date in the preceding year, and less than 8 per cent. were out of service for repairs. The condition of the power was far better at the close of the fiscal year 1911 than it was at the end of the previous year. This is clearly reflected by the fact that the miles run per engine failure increased from 21,000 in 1909-10 to an average of 30,000 per month for 1910-11, and in June, 1911, the miles run per engine failure averaged 51,000.

WHY THIS IMPROVEMENT?

On Friday, April 1, 1910, M. K. Barnum was appointed general superintendent of motive power. He immediately began to plan for greater efficiency and more effective work in the mechanical department. Stated in general terms the improvement in results was obtained in three ways: by increasing the supervision; by eliminating unnecessary work, being at the same time careful not to interfere in any way with the successful operation of the equipment; and by the introduction of modern machinery and shop equipment. The fact that a large amount of freight equipment was repaired in outside, or contract, shops during the first six months of the fiscal year 1909-10 was, of course, responsible to a considerable extent for the high cost of maintenance. However, with better supervision and the elimination of unnecessary work it was found that it was not necessary to have this work done outside.

The effect of increased supervision—the present organization of the mechanical department will be considered at length in the latter part of this article—made itself felt in many ways. One or two illustrations will bring this out plainly. The establishment of a test and inspection department caused a marked improvement in the class of material which was being furnished to the road, saving thousands of dollars. Before this department was inaugurated, material was frequently delivered as first class which had been rejected by other roads which maintained inspection bureaus. An important saving has also resulted from the better contracts which it has been possible to make, because of having better and more thorough supervision over the work.

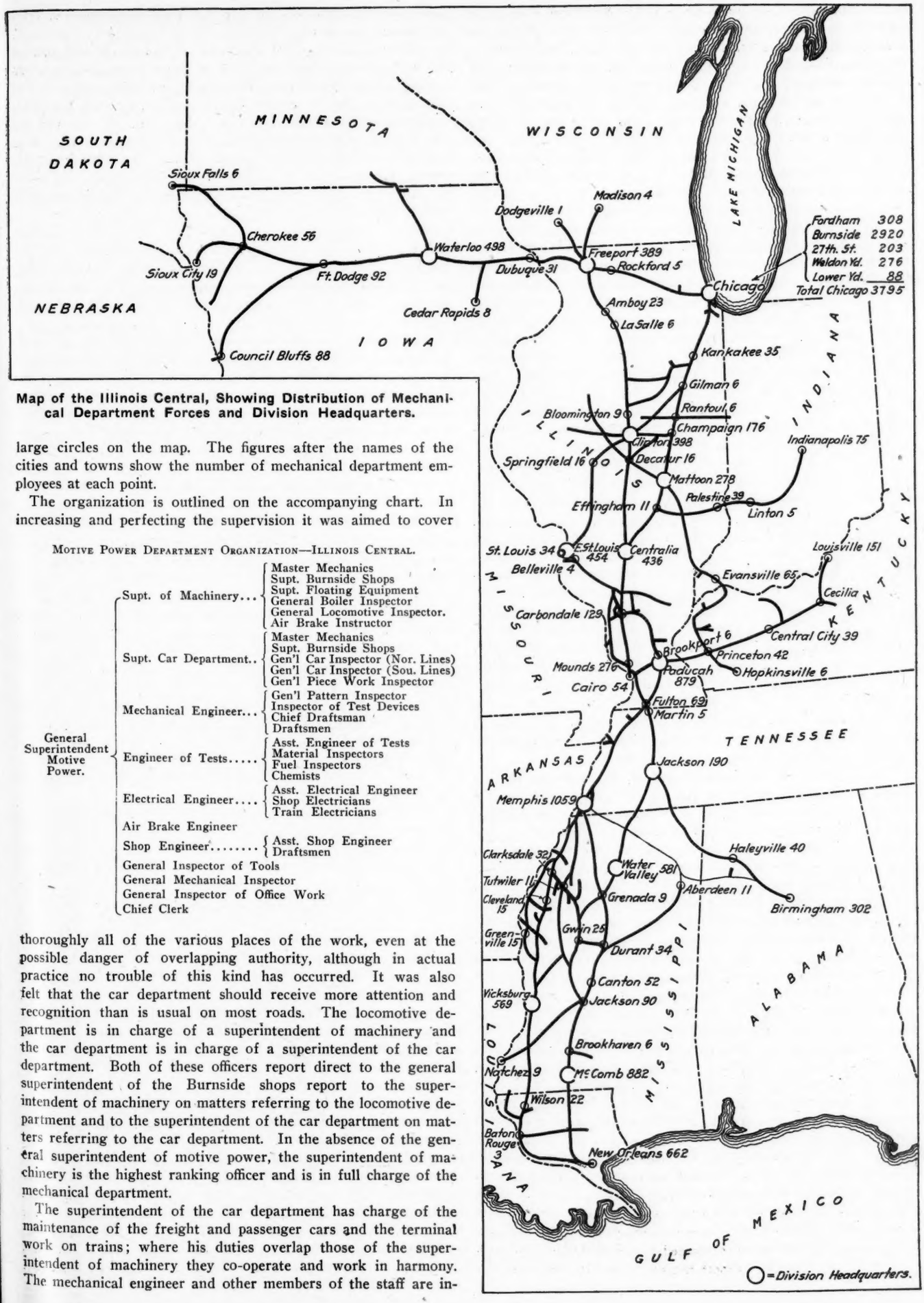
Following are a few examples of the elimination of unnecessary work: Cabooses were being painted a bright vermillion at a cost of $15 apiece over what it would have been had common freight car paint been used. Within a few months it was impossible to distinguish between the color of the freight cars and the cabooses. Every time the railway's trade mark was placed on one of the 35,000 house cars it cost $1, although it served no useful purpose. Trucks under old equipment were being replaced with expensive steel trucks, although the age and condition of the car bodies were not such as to justify this unnecessary expense. A saving of $25,000 per year has resulted from the relining of journal brasses instead of selling them as scrap. The repainting of freight car trucks when passing through the shops for repairs has also been discontinued, as investigation proved that it was a useless expense. In a similar way the treatment of passenger cars and locomotives in passing through the shops has been greatly simplified, care being taken, however, not to affect the efficiency or appearance of the equipment. The methods of reclaiming scrap or second hand material, another important development, were described at length in the *Railway Age Gazette* of September 1, 1911, page 441.

Very little new machinery or shop equipment was added during the fiscal year of 1910-11, but quite extensive improvements in the shop power plants are now under way which will greatly increase their economy and efficiency. The effect of this will be apparent in the future.

MOTIVE POWER DEPARTMENT ORGANIZATION.

Some idea of the improvements which have been made in the organization and their possible effect on future economies may be gained from a detailed study of the organization. As may be seen from the accompanying map, the Illinois Central operates in 14 states, reaching from Minnesota and South Dakota on the north to Louisiana, Mississippi and Alabama on the south, and from Indiana and Kentucky on the east to Nebraska on the west. Compared with the Chicago, Burlington & Quincy, whose mechanical department organization was described in the *Railway Age Gazette* of May 6, 1910, page 1136, it has 6,125 miles of track or 2,950 miles less than the Burlington. On the other hand it has 188, or about 12 per cent. less locomotives, and about 5,700 more cars.

The headquarters of the mechanical department are at Chicago, and here also are located the Burnside shops, the largest on the system. These shops are under the control of a shop superintendent, while the eleven other shops on the system are operated under the direction of the master mechanics on whose divisions they are located. The fourteen divisions and the headquarters of the division master mechanics are indicated by the



Map of the Illinois Central, Showing Distribution of Mechanical Department Forces and Division Headquarters.

large circles on the map. The figures after the names of the cities and towns show the number of mechanical department employees at each point.

The organization is outlined on the accompanying chart. In increasing and perfecting the supervision it was aimed to cover

MOTIVE POWER DEPARTMENT ORGANIZATION—ILLINOIS CENTRAL.

General Superintendent Motive Power.

- Supt. of Machinery...
  - Master Mechanics
  - Supt. Burnside Shops
  - Supt. Floating Equipment
  - General Boiler Inspector
  - General Locomotive Inspector.
  - Air Brake Instructor
- Supt. Car Department..
  - Master Mechanics
  - Supt. Burnside Shops
  - Gen'l Car Inspector (Nor. Lines)
  - Gen'l Car Inspector (Sou. Lines)
  - Gen'l Piece Work Inspector
- Mechanical Engineer...
  - Gen'l Pattern Inspector
  - Inspector of Test Devices
  - Chief Draftsman
  - Draftsmen
- Engineer of Tests.....
  - Asst. Engineer of Tests
  - Material Inspectors
  - Fuel Inspectors
  - Chemists
- Electrical Engineer....
  - Asst. Electrical Engineer
  - Shop Electricians
  - Train Electricians
- Air Brake Engineer
- Shop Engineer.....
  - Asst. Shop Engineer
  - Draftsmen
- General Inspector of Tools
- General Mechanical Inspector
- General Inspector of Office Work
- Chief Clerk

thoroughly all of the various places of the work, even at the possible danger of overlapping authority, although in actual practice no trouble of this kind has occurred. It was also felt that the car department should receive more attention and recognition than is usual on most roads. The locomotive department is in charge of a superintendent of machinery and the car department is in charge of a superintendent of the car department. Both of these officers report direct to the general superintendent of the Burnside shops report to the superintendent of machinery on matters referring to the locomotive department and to the superintendent of the car department on matters referring to the car department. In the absence of the general superintendent of motive power, the superintendent of machinery is the highest ranking officer and is in full charge of the mechanical department.

The superintendent of the car department has charge of the maintenance of the freight and passenger cars and the terminal work on trains; where his duties overlap those of the superintendent of machinery they co-operate and work in harmony. The mechanical engineer and other members of the staff are in-

structed to furnish such assistance and information as may be desired by either the superintendent of machinery or the superintendent of the car department.

The superintendent of floating equipment, who reports to the superintendent of machinery, has charge of the inspection and maintenance of 23 boats, including tugs and barges, which are used for transferring cars at various places on the Ohio and Mississippi rivers. His headquarters are at Paducah, Ky. The machinery and boiler repairs are generally handled in the locomotive shops at that point, while the work on the hulls is done in a contract marine shop at Paducah.

The general boiler inspector supervises the locomotive, marine and stationary boiler inspection for the entire system, visiting the various shops and engine houses, and seeing that the local and federal laws governing boiler inspection are carried out. A record of all the locomotive boiler inspections is kept in his office.

The general locomotive inspector looks after the maintenance and upkeep of the locomotive machinery parts which affect the steam economy, and among other things has been giving special attention to cylinder packing. He also looks after special assignments in connection with the inspection and maintenance of locomotives.

The air brake instructor has charge of the air brake car and looks after the instruction of the enginemen, workmen and shopmen in the operation and use of the air brakes.

The duties of the general car inspectors are evident from their titles. One of them has charge of the territory south of the Ohio and the other of the northern and western lines. They see that the car inspectors understand their duties thoroughly and also instruct the new men. They visit the repair tracks to see that the safety appliance regulations are properly carried out and look after other special assignments. The general piece-work inspector looks after the piece work in the car department.

The mechanical engineer has supervision over the design of cars and locomotives, and also looks after the testing of mechanical devices. He is assisted by a chief draftsman, who directs the work of the drafting room. The general pattern inspector checks the designs of patterns, making sure that excess material is not used. He also looks after the pattern record, which is kept in the form of a loose leaf book. Bulletins of changes of patterns, or new patterns, are sent out under his direction periodically.

The inspector of test devices looks after the special devices which are installed for test purposes. Every road tests new devices to determine whether the standard practice should be improved. The value of this work, however, is often almost, or entirely, lost because the devices are not closely followed in service. The inspector of test devices keeps an accurate card index record of when each device is applied, the name of the manufacturer, the price, etc., and periodically examines the device on the car or locomotive and consults with those who come in direct contact with it. These results are immediately noted on the proper card at headquarters, so that any of the mechanical department officers and the purchasing agent can get the latest information about the test devices by referring to the card index.

The engineer of tests has charge of the inspection of the material used by the mechanical department, including the fuel for both the locomotives and the shops. He also supervises the tests of various kinds of supplies. His force includes an assistant, material inspectors, fuel inspectors, and chemists. The chief material inspector has charge of the material inspectors, and in addition to the duties ordinarily involved in this work studies the performance of the material in service, looks into the causes of failures, and also has charge of the reclaiming of scrap or second hand material. The latter department includes a rolling mill with a head roller, heater, catcher, straightener and laborer; also a department in which air and steam hose are fitted up and repaired, the work being done by a foreman and six men; the relining of journal brasses is handled by a foreman and three men.

The fuel inspectors inspect the coal when it is loaded at the mines and check to see that it contains no impurities and does not have an excess of screenings. While traveling in connection with their duties they are instructed to ride on the locomotives and watch the performance. Nine of these inspectors look after the coal which is purchased from 45 mines. They work closely with the mine superintendents and miners, and are expected at all times to know the exact conditions in the mines. By following up this work closely it is possible to reduce the number of engine failures to a minimum and to greatly increase the efficiency of the motive power. The chemists look after the laboratory work and are also trained in material inspection, so that in case of a rush of this work they can be called upon to help out.

The electrical engineer has charge of the shop electricians and makes estimates for and superintends the installation of wiring for both light and power. He also has charge of the electric lighting of trains, which is done exclusively by the axle lighting system. He has an assistant and a force of shop and train electricians.

The air brake engineer is expected to keep informed as to the latest and best air brake practice, but he also looks after such details of shop practice as may be assigned to him. The air brake instructor, who was noted as reporting to the superintendent of machinery, is expected to carry out the air brake engineer's policy and instructions, but the details of his work are handled under orders from the superintendent of machinery, as indicated on the chart.

The shop engineer designs all shop additions and improvements, and supervises and carries out all plans for this class of work. In short, he is a specialist in shop design and is expected to keep informed as to the latest and best shop practice.

The general inspector of tools visits the different shops and keeps fully informed as to the condition and efficiency of the machine tools and of the portable tools which are kept in the tool rooms. He also studies the condition and efficiency of the tool rooms and checks all requisitions for tool room supplies. He is required to investigate the best designs of machine tools when lists are being made up for new tools, and he also attends to the transfer of tools between the different shops. In brief, he is expected to be fully informed on the subject of machine tools in the Illinois Central shops and as to the results which may be obtained from the latest designs of tools of the various manufacturers, so that he can advise as to the replacement of old tools, or as to their transfer from large shops to those of less importance.

The general mechanical inspector has been investigating the power situation on the Illinois Central, and has visited all the division officers; a report is in preparation which will recommend such additional new power as may seem best, and also a redistribution of the power now in service. He will be detailed on similar investigations of various kinds, including the economical use of locomotive fuel and shop efficiency problems.

The general inspector of office work visits the various offices and confers with the master mechanic and his assistants to see that all reports are correctly and uniformly made. He also passes on new forms for reports and on other questions in connection with office work. The value of this work is shown by the reduction of about 35 per cent. in the number of mechanical department reports during the past year, although all the necessary information is now being obtained and in better shape than formerly.

The following account of the way in which he has handled the work may be of interest. After studying the reports which were received in the office of the general superintendent motive power he found it advisable to start his investigations by seeing how this data was gathered in its early stages by the master mechanic. The most important outside points were visited and a complete list of the reports made out in connection with the mechanical department was obtained. Each of the master mechanics was then consulted, local conditions were considered, and any reports which were being furnished which were not

necessary, or of little or no value, were discontinued at once. The progress of these reports was then followed until they left the hands of the master mechanics; as a result it was possible on January 1, 1911, to eliminate twelve reports and to have five others kept as a local record for the inspection of the master mechanic on his visit to the shops. This left a clear field for the study of the reports coming from the master mechanic's office to the superintendent motive power. These were carefully investigated and listed, and those which were not desired were cut out. It was found that many of the report forms were obsolete and that others could be consolidated. Each separate form was discussed with the master mechanics in order to prevent the elimination of any that might be needed for recording purposes. Up to October 21, 1911, 178 of the forms had been entirely revised, 47 eliminated and 23 others were consolidated into eleven forms, thus making a total reduction of 76 forms, including the 17 which had been eliminated January 1, 1911. It is quite probable that a larger reduction will be made as the stock of certain forms runs out.

By the gradual elimination of unnecessary forms the clerks in the offices of the master mechanics have been able to give more care to necessary work. The duties of each clerk have been studied and by a rearrangement of their work it has been possible to practically eliminate overtime among the clerks, thus creating a much better condition. Formerly the master mechanics were required to furnish the superintendents with reports different from those which were sent to the superintendent of motive power; in many instances the superintendents have found that they could use a carbon copy of the superintendent motive power's report, with a consequent reduction in clerical work.

The chief clerk, whose name appears last on the organization chart, performs the usual duties of this office for the entire mechanical department at the general offices in Chicago.

NEW SIGNALS ON THE PENNSYLVANIA.

As announced in the *Railway Age Gazette* of December 29, the Pennsylvania plans this year to install new automatic signals on 111 miles of road. An officer of the road has given us an interesting description of this proposed new work, prefaced by a brief sketch of what has been done by the signal department of the road during the past six years, all of which is given below.

The automatic signals on the West Jersey & Seashore Electric line and on the Central division were installed in 1906, the latter being the first example of Philadelphia, Baltimore & Washington upper quadrant semaphores, and of other innovations now well known.

Since that time, five and one-half years, the extension of the automatic signal system on the Pennsylvania east of Pittsburgh has been practically at a standstill. Yet a great amount of signal work has been done. The great Manhattan terminal installation, extending from the Sunnyside yards on Long Island to Newark, N. J., with its interlockings at Sunnyside, New York station and Manhattan Transfer, has been completed.

The line from the west portals of the Hudson and Manhattan tubes, near Summit avenue, Jersey City, to Park place, Newark, has been electrified and the signal system rebuilt throughout this section.

Practically every interlocking on the New York division (90 miles) has been revised. At many of these, long crossovers have been substituted for short ones and signals relocated and made upper-quadrant; while at Bristol, on account of change of line, a new electro-pneumatic interlocking has been installed with alternating current automatic signals for about two miles (four track).

Many new interlockings have been built on the branches; the automatics have been rebuilt on the West Jersey & Seashore steam line; approach locking and electric switch locking have been introduced at nearly all the plants on the Philadelphia terminal division, and the system of signaling changed and all the plants practically rebuilt between and including West Philadelphia and Broad street station (six to ten tracks).

The large new terminal at Baltimore has been almost completed, and the installation (jointly with the Baltimore & Ohio) of the Washington terminal carried to completion, together with electro-pneumatic automatic signals and interlocking plants, with alternating current control, between the Washington terminal and the bridge over the Potomac river.

Electro-pneumatic interlockings have been substituted for mechanical at Bryn Mawr and Glen Loch on the Philadelphia division, and new power interlockings erected at Thorndale and Caln, and an electro-mechanical interlocking erected at Gap, all on the Philadelphia division. Most of the other interlockings on the main line of the Philadelphia division (100 miles) have been remodeled and rebuilt.

Nearly all the interlockings on the Middle division have been revised and rebuilt.

On the Pittsburgh division a majority of the interlockings have been revised, and (in 1906) two very large power plants were installed at East Liberty and Swissvale. Another was put in at Wilmerding (in 1911) and power plants have been substituted for mechanical at Radebaugh and Southwest Junction, the latter being one of the largest in extent in the country. Revisions have been made at Latrobe, and new power plants put in at Derry, Conpitt Junction, Conemaugh and Summerhill.

While a number of large interlockings still remain to be revised, notably the one at Perth Amboy junction on the New York division, in connection with the elevation of the main line through Rahway and duck-unders to the Perth Amboy & Woodbridge branch; and at North Philadelphia, because of additional tracks, together, probably, with changes at Broad street, Philadelphia, still, most of the large propositions in the interlocking field are out of the way, except possibly new interlockings at Harrisburg and Altoona terminals, and a revision at Pittsburgh. Therefore the time is now ripe for the further extension of automatic signals as a substitute for the manual block system, and the management has authorized the installation this year of automatic signals covering about 111 miles of road.

NEW AUTOMATIC SIGNALS.

Between Summerhill and Latrobe on the Pittsburgh division. This will give a continuous system of automatics over the main line of the Pittsburgh division, 114 miles.

The Philadelphia, Baltimore & Washington has automatics from Philadelphia south to Wilmington, 25 miles, and from Potomac river, north through the Washington terminal, to the junction with the Baltimore & Ohio, about five miles. The management has authorized the extension of the automatics from this junction to Baltimore, about 38 miles, and from Wilmington south to Oakington, beyond Havre de Grace, about 35 miles. This will complete the automatics between New York and Washington, with the exception of the stretch from Oakington to Baltimore, about 33 miles, which is postponed on account of some re-location work, and will possibly be completed next year.

A description of these proposed automatic signal installations follows:

The Pittsburgh division is now equipped with home and distant lower quadrant electro-pneumatic automatic signals from Pittsburgh east to Latrobe, about 40 miles. Five miles east of Latrobe lies Derry with a large engine and car yard, roundhouses and power house, and a new electro-pneumatic interlocking with upper quadrant signals. The air main extends from Derry west. The new signals between Latrobe and Derry will therefore be electro-pneumatic.

The eastern end of the division has the same system as the west end. It extends from Altoona west to Summerhill, 26 miles. There is a pumping station at Wilmore, two miles east of Summerhill, so that at present there is a two-mile section of air pipe west of Wilmore with a dead end. At Conemaugh, nine miles west of Summerhill, are the engine houses and yards for

the foot of the western slope of the Alleghanies; also a power house and a large electro-pneumatic interlocking with an air main extending east to Mineral Point, or four miles dead ended. Therefore by putting in about five miles of air main both these dead ends are eliminated; and the mains will be end-fed from Altoona to Conemaugh with intermediate compressors as necessary. The new signals from Summerhill to Conemaugh will therefore also be electro-pneumatic. All the electro-pneumatic automatic signals will be equipped with a. c. magnets. The automatic signals from Conemaugh west to Derry, 24 miles, will be operated by a. c. electric motors, the Union Switch & Signal Company's type T2.

The entire installation from Summerhill to Latrobe will have alternating current track circuits and electric lights. The automatic signals will be upper quadrant three-position, with one arm, of metal, pointed; and a red staggered marker light, except (as noted below) when a second operating arm is used. There are approximately 209 block sections, all end-fed, using polyphase relays, U. S. & S. type, with wireless control of the distant indication, except where the second arm is used. All mechanisms are top-post. This installation, aggregating 49 miles of road and 193 miles of track runs through and affects 13 existing interlockings. Practically all the signals are set on bridges.

Interlocking.—At the interlockings the dwarf signals are mechanical, two-position, horizontal indicating stop and diagonal proceed at low speed. The home signals are three-arm upper quadrant (high, medium and low speed); the two upper arms are three-position, and the low speed are two-position (horizontal and 45 deg.).

In all of the interlocking signals the circuits are direct current, as are those in most of the indicators and approach and through locking instruments; all are fed by storage batteries situated at the cabins and charged through mercury-arc rectifiers of from 10 to 30 amperes capacity, except, of course, the track circuits, which are a. c., using U. S. & S. Co.'s galvanometer and vane type relays.

The distant signals are two-arm; the top arm is three-position, and the second arm two-position; arms pointed, staggered lights, the signals so controlled as to give the following indications:

(A) Stop and proceed.
(B) Proceed, prepared to stop at next signal.
(C) Proceed, prepared to pass next signal at medium speed.
(D) Proceed.

The same aspects and indications are used on some of the automatic signals when, on high speed running ground, the blocks are 4,000 ft. apart, this for facilitating slow freight traffic; but the distant warning is given 8,000 ft. away for the high-speed passenger trains.

Power.—The power for the installation between Conemaugh and Summerhill will be furnished by a 25 k. w. generator at Conemaugh, and emergency taps from commercial lines at Summerhill and Johnstown; the power between Conemaugh and Latrobe by one 75 k. w. generator at Lockport, in the middle of this stretch, with one 25 k. w. generator at Conemaugh, one 75 k. w. at Lockport, and one 75 k. w. at Derry for emergency supply. The current will be furnished at 3,300 volts, 60 cycles, single phase. The power line will consist of two single conductor Kerite wires, No. 6 between Summerhill and Lockport, and No. 4 between Lockport and Latrobe, furnished in 2,000 ft. lengths, laid in creosoted pine trunking laid 2 ft. below top of tie, either on shoulder or between tracks, brought to the surface every 2,000 ft. for joining in waterproof concrete boxes above ground line. The line transformers are the standard commercial type 3,300 to 110 volt; track transformers U. S. & S. Co. air-cooled type 110 primary, with 10-volt taps for signal lamps, and secondary taps for various voltages, 3 to 15, for track feeds.

The line transformers will be housed in iron cases with the sectionalizing outfits. The other transformers, relays, etc., will be put in Pennsylvania Railroad standard relay boxes, fixed in the bridge legs.

MARYLAND DIVISION, P. B. & W.

The Maryland division has home and distant electro-pneumatic lower quadrant signals from Gray's Ferry (Philadelphia) to West yard, Wilmington, this being part of a continuous system, Wilmington to New York. The new installation will continue this automatic protection south 34½ miles to Oakington. The line is double track for ten miles to Newark, Del.; then seven miles three-track; three miles four-track; six and a half miles double; then six miles of four-track, the latter stretch including the two-track draw over the Susquehanna river between Perryville and Havre de Grace, with electric interlockings at each end. From Oakington to Bayview, 29 miles, some changes of line are in contemplation, so this work is deferred and Bayview to Baltimore is in Northern Central territory.

The new automatics then start at B. & P. junction, just south of Union station, Baltimore, and extend to the junction with the B. & O. at Washington, four miles north of the Union station, a distance of 38½ miles, nine miles being four-track, seven miles three-track, and the balance double track. This makes a total of 73 miles of road south of Wilmington to be equipped, approximately 192 miles of track; approximately 202 automatic blocks, with the system passing through and affecting 21 existing interlockings.

All signals will have top-post electric motors—the automatics alternating current, type T2, U. S. & S. Co.; the interlocking signals, except dwarfs and some low-speed arms, direct current type T2. The dwarfs and these low-speed arms are mechanical. There will be alternating current track circuits throughout, and the signals will be electrically lighted.

The number of arms and lights and their general arrangement is exactly like the Pittsburgh division, as is the method of operation of all the types of signals, except as noted above, and except, further, that instead of a mercury arc rectifier at each cabin for charging the storage batteries situated there, there will be a rectifier of 20 amperes capacity at every third cabin, charging portable storage cells for use at the other cabins.

Al track circuits at interlockings will operate vane type relays; all other track circuits will have polyphase relays.

The signals will be principally ground masts instead of being placed on bridges. The line transformers and sectionalizing outfits will be placed in iron shelters on a special signal foundation and under the ladder, while the track transformers and relays will be placed in an iron relay box attached to the front of the mast. Between Bowie and Landover on the southbound tracks, 8 miles, the medium speed distant indications will be given through the automatic territory, this being fast running ground where the blocks average a mile in length.

The power line will be run in trunking, as on the Pittsburgh division, and between tracks, the wire being No. 6 from Wilmington shops, two miles north of Wilmington, to Ruthby power house, nine miles south of Wilmington, and No. 4 from there to Oakington. The power will be furnished by two 75 k. w. generators at Ruthby, furnishing 3,300 volts, single phase, 60-cycle current, with an emergency tap at Wilmington shops of 13½ k. w. capacity; and an emergency generator of 50 k. w. at Perryville.

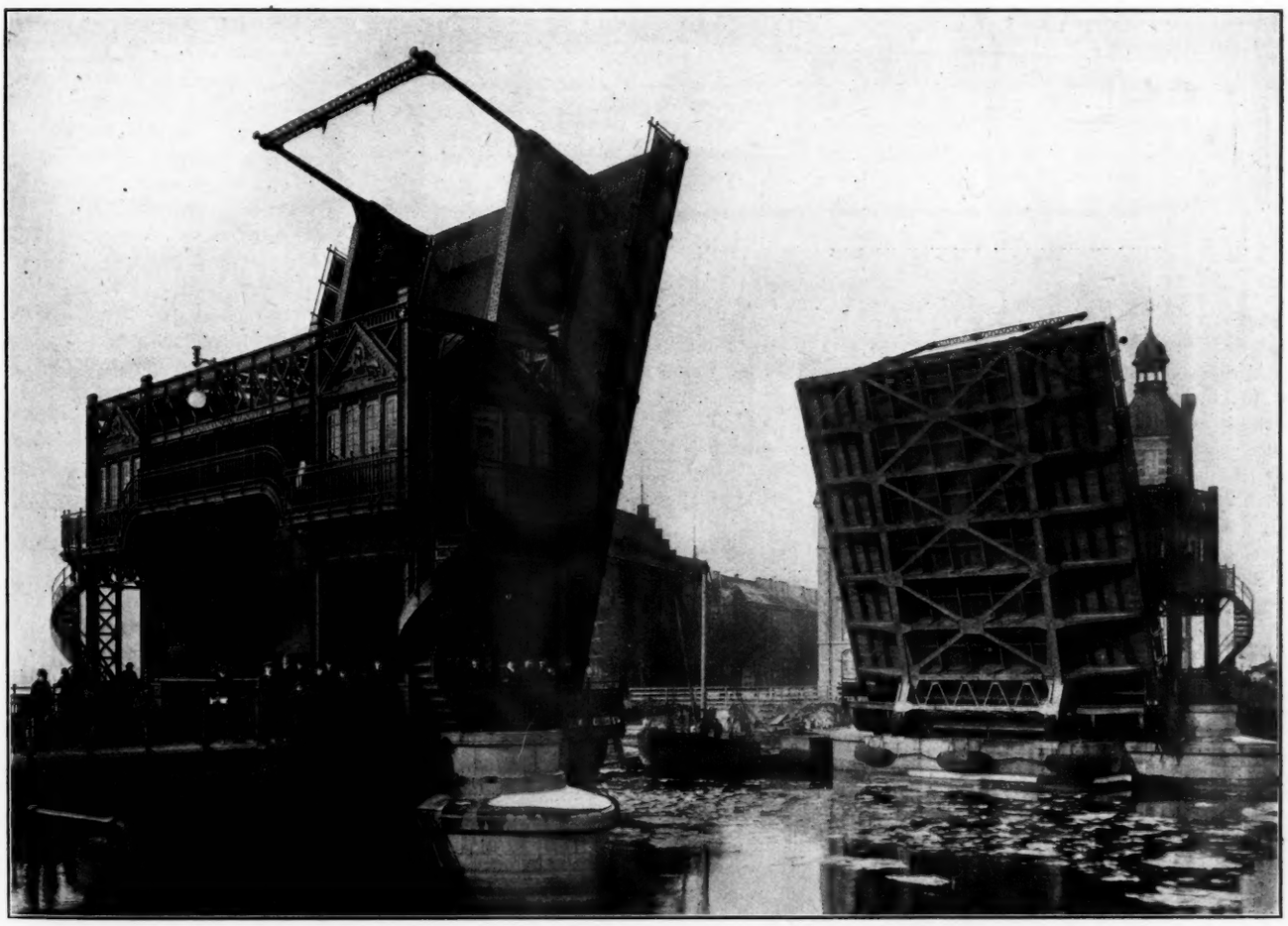
On the south end, the wire will be No. 6 from Baltimore station to Stony Run power house, 11 miles south of Baltimore, and No. 4 flexible to Washington. The power will be furnished by two 75 k. w. generators at Stony Run, with emergency taps to the Northern Central supply from Mt. Vernon power house at Baltimore of 28 k. w., and emergency taps to the Washington terminal lines at "F" Cabin of 37 k. w. From Cabin "F" upper-quadrant, electro-pneumatic signals are already installed through the Union station to Academy station on the Richmond-Washington line, a considerable portion being alternating current.

German exports of rails for the 11 months ending with November, 1911, were 5,083,601 tons, which is 2.6 per cent. more than in 1910, and 40 per cent. more than in 1909. The exports of steel ties were the smallest for many years, and 56 per cent. less than in 1907, yet they amounted to 81,500 tons.

BASCULE BRIDGE OVER HARBOR CHANNEL AT COPENHAGEN.

BY C. VAN LANGENDONCK.

The city of Copenhagen has provided improved facilities for communication between the city proper and the suburb of Christianshavn, on the Island of Amager, which are separated by the harbor channel, by the building of a new bridge of the double leaf bascule type. The bridge has a length of 258 ft. between land abutments, the channel under the movable span having a clear width of 92 ft. 6 in., and a depth of 25 ft. 6 in. The new bridge is ornamental in design, and is in harmony with the picturesque character of the neighboring building. It is located directly north of the structure it superseded, the dock lines being trained, and the angle of the bridge to the current being so arranged as to ensure satisfactory navigation through the bridge.



Double-Leaf Bascule Bridge at Copenhagen, in Open Position.

Owing to the heavy traffic on the waterway, erection involved several difficulties. It was impossible to build the caissons for the piers on the site, and they were constructed in a convenient position in the harbor and towed into place and sunk upon the foundations which had been prepared for them. The caissons have an over all length of 76 ft. 5 in., a maximum width of 26 ft., are provided with chambers into which the tail ends of the leaves descend when the bascules are raised, and also contain a large portion of the hydraulic machinery. They were constructed on slips, each being built up on a ring-shaped iron girder provided with transverse stiffeners. Bottom plates were riveted to the underside of the ring, and to the outside was attached the vertical sheet iron plating forming the wall of the caisson. This was only carried up to a height of a few feet before launching. While the caisson was afloat concrete was laid on the bottom to form a foundation for the masonry, which was built to form a well, with transvere walls serving as buttresses, and with chambers between them. As the mass gradually sank under the weight of the masonry the sheet iron lining was continued upward, a height of about 3 ft. above the water level always being maintained. When the caisson had been built in this manner to the requisite height, the top was corbelled to receive the granite masonry forming the superstructure of the pier.

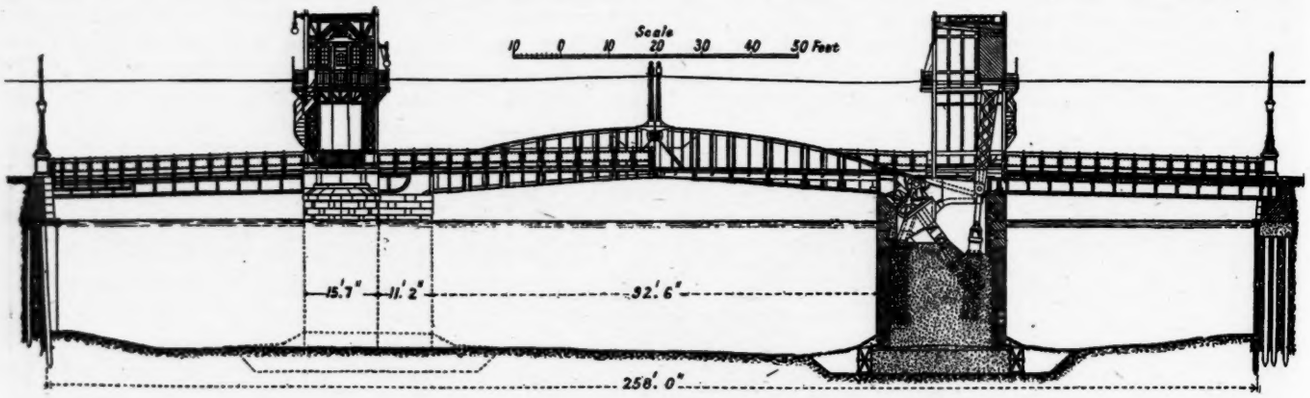
When the bottom of a caisson had sunk to a depth leaving only a space of about 12 in. between its lower surface and the upper face of the foundation prepared to receive it, the caisson was towed into position and slowly sunk until the iron ring girders bore upon the surface of the foundation. Divers then descended to see that the pier was in correct position, and the caisson was grouted to the foundation with cement mortar.

The combined length of the two bascule leaves is 109 ft. between centers, while the fixed spans, which are of ordinary plate-girders, have a length of 55 ft. each. The movable span is constructed in accordance with the Strauss Trunnion Bascule principles. The counterweight, when the leaves are down, is concealed in a tower high above the roadway, being pivotally carried by two legs on pins in the tail ends of the bascule girders, the movement of the counterweight above being controlled by the usual links constituting the characteristic parallel motion of the Strauss design. As the leaf rises the counterweight descends toward the roadway, finally stopping about 7 ft. above the roadway, when the limit of the upward travel of the span is reached. The equipoise of the leaf and its counterweight during this movement is dependent on the four axes of rotation, viz., the axis of

the bascule leaf, counterweight pin in the tail end of the girder, the axis of rotation of the guiding member on the counterweight, and the fixed axis of rotation of the guiding member on the tower structure, lying in the angles of a parallelogram. The advantage claimed for this arrangement is that the length of the tail ends may be considerably reduced, and the counterweight placed overhead or underneath the floor as may in each case be the most suitable. Each of the leaves of the bridge has a weight of 146 tons, and the weight of the counterweights is 247 tons. In order to eliminate all vibration arising from traffic, the bridge has been constructed in such a manner as to act as a 3-hinged arch when closed, the girders meeting on a hinge at the center of the bridge, and the arch thrust being transferred to structural steel skewbacks imbedded in the piers.

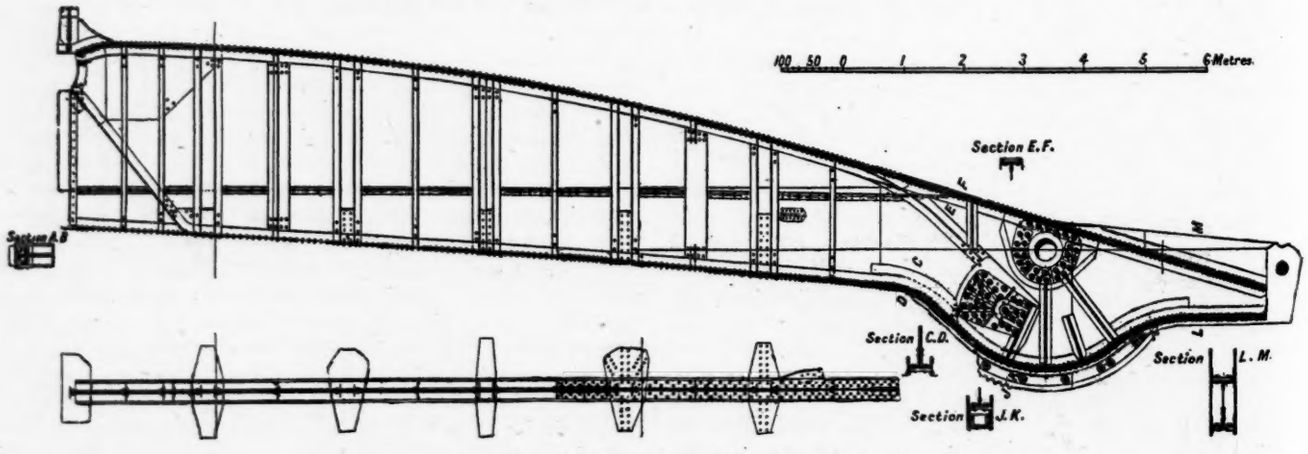
In raising the bascules, the first operation is the lowering of the counterweights upon the tail ends, so that they counterbalance the weight of the leaves. This is carried out hydraulically. The leaves are then raised by means of electrically-driven gearing. Each of the leaf girders has bolted to its tail end a circular rack meshing with a series of gears and pinions, and vertical shafts, which latter extend through the columns of the towers to the operating room above which contains the motors.

When the bascules have been lowered again to their correct position, the pressure of the counterweights on the tail ends of each leaf is removed by hydraulic pistons, which lift the legs of the counterweights until they cease to bear upon the tail ends of the girders. The mechanical action of raising and lowering each leaf is carried out by means of two 54 h. p. electric motors running at 450 revolutions per minute, one in each tower. About 13 kw. is expanded in the raising and lowering of both leaves, and the time occupied in either raising or lowering the bascules is about 25 seconds, the same time being occupied in removing the pressure of the counterweight from the tail ends. When vessels pass the bridge, traffic on the roadway is stopped for about two minutes. The bridge carries two electric street car tracks. The bascule section of the bridge has a roadway of 22 ft. 6 in. opening out on the fixed spans for the convenience of the traffic. On either side of the bascule section is a footpath 11 ft. 2 in. wide, and on the fixed spans this footpath is widened to 13 ft. 8 in. The cost of the whole work amounted to about $285,000. We are indebted for the illustrations and information from which this article was prepared to H. C. V. Möller, chief engineer of the Copenhagen Harbor Board, who designed the bridge in conjunction with the Strauss Bascule Bridge Company, Chicago, Ill., which acted as consulting engineers on the work.



Elevation of New Copenhagen Bridge.

The contract for the construction of the projected Trebizond-Sivas railway, Asiatic Turkey, has been given to a French company, the Régie Générale des Chemins de Fer, of Paris, which recently sent out engineers and surveyors. The plans will be submitted to the Turkish government about the end of March, 1912. The new line starting from Trebizond on the Black Sea, will go by way of Gumush-Hane and Baiburt to Pekkeridji, whence it will branch in two directions, the one following the valley of the Euphrates river eastward to Erzerum, and the other westward to Erzingian, and thence by way of Chardakli to Sivas. The building of the new line will involve not a few physical difficulties, among others the boring of a tunnel nearly 5 miles in length through the Zigana mountain, and a number of smaller tunnels and many bridges. The line will traverse a wonderfully rich and fertile country, and when the primitive crafts on the upper Euphrates are replaced by modern steam transports the river will feed the railway to a very considerable extent.



Details of One of the Lifting Spans.

PRELIMINARY INVESTIGATION OF NEW RAILWAY PROJECTS.

BY A. M. VAN AUKEN,
Chief Engineer, Memphis, Dallas & Gulf.

There are many small investors to whom the large returns from well chosen investments in bonds of new railway projects strongly appeal. It is history that a railway company organized in 1898 was financed by issuing bonds which were placed at a price of 85 cents on the dollar, and the purchaser given a bonus of stock equal in par value to one-half the value of the bonds he subscribed for. Eight years later this stock sold for $180 and the bonds slightly above par. Thus the investor had a market value of:

4 per cent. bonds.....	$1,000	Cost $850	Value $1,080
Common stock, 10 per cent..	500	Cost 000	Value 900
		$850	$1,980

The yearly income on these securities was $90.

Many investors are deterred from investing by the number of roads that have been reorganized, to the serious injury of stockholders, and ask themselves if there is not some way to be sure of success in such investments. It is the aim of this paper to suggest a plan by which the investor may form a fair judgment of the enterprise, and protect himself.

It is assumed that the investor has read the prospectus of the company; that the route selected has been pronounced feasible by a competent engineer; and that a traffic man has passed on the probable traffic and earnings. These are matters so frequently treated, and possessing so many technical phases that they will not be touched on here. But it is true that many enterprises which are passed on favorably by such investigators, fail to earn the sums estimated. This phase of the subject covering traffic in products of the forest and farm will be touched on in this paper. A given tract of timber can be counted on for a given amount of traffic. Under favorable conditions this should be moved in a definite number of years. Often this traffic fails to be secured, and disaster results. Agriculture may fail to develop. These results may come after the proposed road is completed and is unable to offer transportation facilities from the following causes: lack of cars or locomotives, with which to move the traffic offered, lack of connecting tracks at junction points to permit expeditious transfer of business, lack of connecting lines giving the line access to large markets, or lack of sufficient passing tracks to permit expeditious handling of trains. These necessary facilities must be provided in the building and equipment of the road, and it is because they are partially omitted that many enterprises fail.

The writer was asked by a banker in 1902 to give his opinion on a proposed line which was planned to connect a city on the Ohio river with two on the Gulf of Mexico. The preliminary estimate called for an outlay of $14,255 per mile. As this line would have to compete with high-class lines for through business, as well as to offer as favorable rates for local business as could be secured from parallel lines, it was reasoned that it must be laid with at least 75-lb. rail and be well ballasted. Such a track would have cost at that time about $10,000 per mile for material and labor, allowing that sidings and similar tracks would add one-eighth to the track mileage. Experience shows this portion of the cost to be about one-fourth the total for a high-class through line, which would raise the cost of this road per mile to $40,000, or nearly three times the promoter's estimate. The road has had a stormy career, and is just emerging from a receivership. The present plans call for $30,000 per mile as a needed amount with which to put it in shape to compete for business with its competitors.

In 1907 I was asked to make an estimate of the cost of a road 150 miles long which was what might be called a secondary main line. It developed much new territory, held a strong strategic position owing to its position between two rivers, and occupied good territory, but did not reach any cities of first-class traffic importance. The estimate amounted to $18,150 per mile. By the promoter's instructions this was cut down by omitting cost of right of way, fencing, terminals, telegraph and ballast and greatly reducing the length and number of passing tracks, and the like. The road has been far from successful. It has lost much business from not having cars to load it in. Owing to insufficient width of roadbed it has suffered from track imperfections, and its cost of operation has been very high. It is now trembling on the verge of receivership, and cannot maintain its roadway and equipment to standard. Over a year ago the general manager of a railway asked the writer to look over an estimate, his chief engineer being absent on sick leave. This called for an expenditure per mile of $6,820, and it was noticed that the cost of track material and labor amounted to $4,400. A test with known prices showed this to be about correct. It was assumed this would be 40 per cent. of the cost of the line, and such cost placed at $11,000 per mile. Its actual cost was very close to that.

The following percentages were obtained from a table given in an article by John F. Wallace, then chief engineer of the Illinois Central, and published in the *Engineering Magazine* some fifteen years ago. The costs are not given, as they have no relation to those of today, but the percentages are given in the table following:

Element of Cost.	Main Line. Per Cent.	Secondary Main Line. Per Cent.	Minor Branches. Per Cent.
Right of Way.....	5.0	5.6	6.7
Fencing	1.0	1.6	2.0
Grading	30.0	24.0	20.0
Bridges and Culverts.....	10.0	10.0	10.0
Telegraph	0.8	1.2	1.3
Track, material and labor.....	17.5	25.6	40.0
Ballast	7.5	9.6	0.0
Water supply, staitons, etc.....	2.5	2.8	3.3
Rolling stock and equipment.....	10.0	10.0	9.3
Proportion of terminals.....	12.5	6.0	3.3
Engineering	1.8	2.0	2.7
General and legal.....	1.5	1.6	1.3
	100.0	100.0	100.0

It is not contended that these amounts, or percentages are absolute. They will vary largely. But it is believed their use will assist an investor to determine if contingencies have been provided against. Right of way may cost much less, but it may cost more. Grading will vary largely, but when it does, the reason should be determined. When there is a heavy amount of timber trestling it is well to ask if provision has been made for renewals in the estimate of operating expenses. A timber trestle will need renewing every seven years in the Gulf states, and ties every six. Rebuilding a trestle costs about 80 per cent. of its original cost. Tie renewals cost the same with ten cents for placing in track. Look to these two items in the maintenance estimates. By securing the statistics of the Interstate Commerce Commission it is easy to learn what have been the various costs of the elements of cost and maintenance of the roads in that particular locality, and it can be seen if the prospectus allows proper amounts for operation and maintenance.

The tables following give for each of the three roads already mentioned in this article the cost of the Wallace table, in column 1; the cost as estimated by the promoter in column 2, and in column 3, for the first road, the cost of construction, plus the amount now needed to put the road in shape; for the second road, the writer's detailed estimate, and for the third road, the actual cost of the line as furnished the writer by the auditor of the parent company:

	Road No. 1.		
Elements of Cost.	Wallace's Table.	Promoter's Estimate.	Cost of Original Construction and Needed Betterments.
Right of way.....	$2,000	$605	$1,200
Fencing	400	100	350
Grading	12,000	3,000	13,000
Bridges and culverts.....	4,000	1,200	4,300
Track material and laying.....	7,000	4,500	10,500
Ballast	3,000	800	2,500
Water supply, stations, etc.....	1,000	600	1,200
Equipment and rolling stock....	4,000	1,600	5,000
Proportion of terminals.....	5,000	1,000	5,700
Telegraph	320	150	350
Engineering	720	350	850
General and legal.....	600	500	850
	$40,040	$14,255	$45,800

ROAD No. 2.

Elements of Cost.	Wallace's Table.	Promoter's Estimate.	Writer's Estimate.
Right of way	$1,200	.....	$600
Fencing	350	.....	150
Grading	5,180	$2,880	4,000
Bridges and culverts	2,150	1,350	1,800
Track material and labor	5,500	5,500	5,500
Ballast	2,000	000	1,500
Water supply, stations, etc	600	500	600
Equipment and rolling stock	2,150	600	2,000
Proportion of terminals	1,300	000	1,000
Telegraph	260	100	250
Engineering	430	250	400
General and legal	345	300	350
	$21,500	$11,480	$18,150

ROAD No. 3.

Elements of Cost.	Wallace's Table.	Promoter's Estimate.	Actual Cost.
Right of way	$738	$250	$520
Fencing	220	100	180
Grading	2,200	1,100	2,450
Bridges and culverts	1,100	560	850
Track material and labor	4,400	4,400	4,350
Water supply, stations, etc	363	150	333
Rolling stock and equipment	1,023	000	950
Proportion of terminals	363	000	338
Telegraph	143	000	150
Engineering	297	150	285
General and legal	143	100	340
	$10,990	$6,820	$10,746

In each of the above it will be seen how the promoter, in his anxiety to make a showing for economy, eliminated essentials. I have little actual knowledge regarding details of the first line. It was understood that it was forced to pay high prices for the right of way, and as a matter of economy passed to one side of several cities of considerable size, being later ordered by the courts to build into them. The width of the roadbed was reduced from 16 to 12 ft. on embankment, and from 20 to 14 ft. in cuts; guard rails were left off the bridges; wooden culverts were used; 60-lb. rail was laid in place of 75-lb. rail; the passing tracks were shortened to 2,600 ft.; no section houses, and but few depots, were built, etc.

As stated above, this railway went into the hands of a receiver, and is emerging from a drastic reorganiaztion. This should have been foreseen from the utterly inadequate funds provided. To secure competitive business a road must have its terminals as near the business center of a town as its competitor. Otherwise, drayage charges will deprive it of all competitive business.

The second line has been in operation about two years. It has such a struggle to meet its fixed charges that is is not keeping up its roadbed or bridges. In trying to build for the amount available, the promoter cut down the width of roadbed from 16 to 14 ft. on fills and from 20 to 18 ft. in cuts; he used 60-lb. in place of 70-lb. rail; built no section houses; omitted nut locks; used but two bolts per rail joint, built no yards or stations at the terminals, but rented from connecting roads, etc. This line will have to secure money soon from some source. It cannot get the business which it should have from lack of cars and engines. The timber along the route is not getting to market, and the land is not being brought under cultivation.

In the case of the last named line the promoter objected most vigorously to being charged for the wye and two yard tracks made necessary to enable the main line to care for the business of the branch, and to charge for engine and cars assigned to the line. He maintained that the parent company should take care of its own yard.

The question of a provision for terminals is always a troublesome one. There can be no rule laid down, but perhaps an estimate based on ten dollars per inhabitant for towns up to, say, 50,000 inhabitantts, will come near it. Terminals for a town located along a river where the space which can be used for railway tracks is limited will cost much more. In states where the laws allow vacation of streets to a railway, this may be reduced somewhat.

Another reason why investors may, and often do, lose, is inadequate surveys for location. The promoter is often very short of money, and makes very few surveys prior to attempting to finance a project. The railway lines above mentioned had expended for surveys prior to making financial arrangements the following:

No. 1—400 miles	$10,000	Per mile	$25.00
No. 2—150 miles	7,500	Per mile	50.00
No. 3— 30 miles	2,800	Per mile	93.33

It is difficult to state what amount should be expended. Unless an adequate amount is spent the best line will not be secured, but the mere spending of money will not secure it.

It was estimated that surveys in the Rocky Mountains for the Union Pacific in the eighties cost $200 per mile of located line. Willard Beahan gives, in his work on railway location, details of five surveys in Missouri and Kansas where the location cost from $30.17 to $57.43. This is supposed to be for location alone. Preliminaries are in addition to this. F. Lavis, in his work on railway surveys, gives costs of four preliminary surveys for the Choctaw, Oklahoma & Gulf, covering 563 miles, which vary from $19.60 to $60.95 per mile; also for five located lines covering 188 miles, which vary from $44.43 to $90.47 per mile. Assuming two miles of preliminary to one of location, this shows a range from $83.63 to $212.37. He gives the total cost of the 188 miles of location as $192 per mile of located line, including preliminary.

I have secured the data from two lines which were built between 1897 and 1900 and the exact costs of the engineering on each. The first was a cheap line in the easiest portion of Oklahoma. It was about sixty miles long. The gradient was 0.6 per cent. The quantities averaged about 6,000 yds. to the mile, and it was laid with old steel which had been taken from other parts of the main road.

The percentages of the cost of the various items were as follows:

	Per Cent.
Grading	19.6
Bridges and culverts	10.7
Track material and labor	34.1
Ballast and surfacing	9.1
Fencing, cattle guards, etc	1.9
Right of way	3.0
Engine houses, water supply, etc	6.9
Locomotives and cars	10.2
Engineering	2.3
Office and legal	2.2
	100.0

Cost of engineering was as follows:

	Per Mile.	Per Cent.
Reconnaissance	$1.15	0.7
Preliminary survey	23.20	15.3
Location survey	39.80	26.5
Construction engineering	76.50	51.3
Permanent way survey	9.30	6.2
Total	$149.95	100.0

Under the head of reconnaissance is included the cost of procuring maps of the territory, and such studies as were made in the chief engineer's office preparatory to the inauguration of the work. Under the other heads are included the cost of all work done in the chief engineer's office, including a percentage of the salary of the chief engineer and his office force during construction. The permanent way party measured to all lines, located all buildings on the right of way, mile posts, bridges, culverts, etc., and made permanent maps.

The other was a much heavier line in Texas, 150 miles long. The maximum grade was 1 per cent., with 4 deg. curves, earthwork quantities averaging 30,000 yds. to the mile. On this line the proportions of the different classes of work to the total were as follows:

	Per Cent.
Engineering	2.0
Executive and legal	1.6
Right of way and fencing (includes cattle guards and road crossings)	2.1
Grading	24.0
Bridges and culverts	15.0
Track material and labor	24.1
Ballast, surfacing, etc.	7.0
Water supply, buildings, etc	8.8
Locomotives and cars	15.5
	100.0

The engineering costs are shown in the following table:

	Per Mile.	Per Cent.
Preliminary	$1.00	0.26
Reconnaissance	3.10	0.76
Preliminary surveys	53.50	13.14
Location surveys	84.40	20.73
Construction engineering	229.00	56.26
Permanent way surveys	36.00	8.84
	$407.00	100.00

Under the head of preliminary is embraced all engineering expense, including purchase of maps, filing maps with railway commission, studies made in office, etc. A charge was made for all work done in the chief engineer's office, also for a part of the time and expense of him and his assistants, clerks, etc., during construction and location. The permanent way party gave track centers and ballast grades, chained in all buildings, structures and openings, set stakes for all mile and signal posts, tied in all land corners, set limit posts to property corners, and made permanent maps and profiles.

These are costs incurred by well managed roads with capable engineering departments. It is not probable that work can be done for less. It would have been wise for the investors considering buying securities of roads Nos. 1 and 2, to have insisted that an amount equivalent to $150 per mile be spent on surveys before their money should be forthcoming. The investor would also be wise to insist on naming some of the engineers. He might name a consulting engineer, and have the locating engineers report jointly to him and the chief engineer. Then they could know the line was properly located. The late D. H. Ainsworth, of Iowa, is quoted by A. M. Wellington as saying that the location of a road was giving it is constitution. "It might be sick, nigh unto death, from evils of mismanagement, but with a good location it would survive and live."

The above actual records show how minor an item location is. On the Texas line a saving of 1 per cent. in the cost of grading would have paid for increasing the reconnaissance and preliminary surveys over 90 per cent., and the cost of preliminary and location over 35 per cent. The saving of 1 per cent. in the cost of bridging and culverts would have paid for an increase in reconnaissance and preliminary of over 20 per cent. On the Oklahoma line a saving of 1 per cent. in the cost of grading would have paid for increasing the cost of reconnaissance and preliminary 60 per cent., and the cost of location and preliminary over 20 per cent. A saving of 1 per cent. in the cost of bridges and culverts would have paid for increasing reconnaissance and preliminary surveys 25 per cent., and the cost of location, preliminary and reconnaissance 10 per cent.

In the absence of this careful location, the road may be located without regard to its best interests. There was once a road, which has now been absorbed into a larger system, which was projected to run from Des Moines, Ia., to Kansas City, Mo, Some forty miles south of Des Moines it turned to the east and ran in that direction over twenty miles, every mile taking it away from its destination, and for no reason but that the promoter received a subsidy from a town there. This ruined the line.

Three concrete illustrations from personal experience will be given of the evils of insufficient preliminary engineering. The first case was in the mineral district of Alabama. While going over the ground for another company which was considering building into the district, the writer was impressed with the line as a horrible example of poor location. It was 30 miles long, but was a continuation of two roads. It served five mines, the three best and biggest producers not being on the main line, but on two spurs, respectively 1.85 and 1.23 miles long. It was found that a line could be located between the terminals, reaching the two mines on the line and the three on the branches, with no greater mileage, no heavier work and equally good grades as the line now built. This would save the two spurs. Before condemning the engineer, some inquiries were made, and it was found that the construction was started before the location was completed; there had been no preliminary, and barely enough reconnaissance to find a possible line. The construction was done to forestall a competitor, and the two roads subsequently joined in building the inferior line. There were six daily trains operated over this branch, each of which made the extra 3.08 miles each day, or 36.96 miles in all. If it is estimated to cost one dollar per mile to operate a train, this would make the cost $13,490 per year to operate this increased distance, which is 6 per cent on $224,840. To this should be added the cost of building the 3.08 miles, or $70,234, which makes the wasted money $295,074 a year. This could have been saved by an expenditure of less than $100 for a reconnaissance, or less than $1,000 for a preliminary. As strategy entered in this case, it may be the prestige gained was worth this, although it might have meant the ruin of a weak road.

In 1907 the writer was engaged to make a location for a road between two points 23 miles apart by the preliminary. The line crossed an arm of a lake with a trestle 4,800 ft. long. It was found possible to secure an equally good alinement with no heavier work, which at the same time shortened the line 1.54 miles and eliminated 4,000 ft. of this trestle, besides reaching an industry giving the road three cars of freight per week, and losing no traffic the other line would have secured. The saving was:

4,000 lin. ft. of pile trestle, at $6.00	$24,000	
Cost of building 1.54 miles road	18,700	
		$42,700
Capitalized value of saving the renewing of 4,000 ft. trestle	$51,600	
Capitalized value of saving 1.54 mile distance	8,150	
		59,750
		$102,450

The third instance was the construction of a 16-mile extension of a 40-mile road. When the writer was engaged the line had been surveyed for a 3 per cent grade, and was built nearly to the foot of this grade. The manager was asked for authority to back up two miles and take another route, by which a grade of 1 per cent. could be secured, but he would not consent to this. A line was finally located up the hill with a 2.5 per cent. grade, omitting one curve, and climbing no higher at the summit. This grade made it necessary to use four trains to do work which could have been done by two had the line been changed to the 1 per cent. grade. Including doubling for part of the distance this required 110 train miles per day additional, which, if estimated at one dollar per mile for 310 days, omitting Sundays, and the three national holidays, gives an annual expense of $34,100, which is 6 per cent. interest on $568,333. This could have been saved to this company if the engineer had possessed authority to do what an engineer is hired to do—save his employer money.

To recapitulate, if the prospective investor, after assuring himself of the strategic position of the proposed line, and of its resources and its future, will take the Wallace table and test the provisions of the estimate of cost, seeing that it provides for equipment and terminals, as well as the apparent essentials, and will then take precautions to see that his money is wisely expended, his investment should be reasonably safe, subject to as few hazards as any business venture, and he should reap, jointly perhaps with the promoter, the underwriter's profit, which is always good, and often very large. It should be borne in mind, however, that these tables may not be applicable to roads east of the Mississippi and north of the Ohio. In these regions competition is so sharp, and low grades, interlocking plants, absence of grade crossings, etc., are essential; and each road must be in a class by itself. On some roads in Ohio, for instance, the masonry and steel structures will each exceed the cost of the rails.

The building of Turkish government railways in the Arabian province of Yemen, involves the expenditure of over $10,000,000. A line from Hodeidah to Hajila, at the foot of the mountains, having a total length of 69 miles, is already under construction. This, together with a line of 10 miles from Hodeidah to the new port at Ras-el-Ketib will be constructed with all possible haste.

ACCIDENT BULLETIN NO. 41.

The Interstate Commerce Commission has issued Accident Bulletin No. 41, containing the record of railway accidents in the United States during the three months ending September 30, 1911. The number of persons killed in train accidents was 201, and of injured 4,283. Accidents of other kinds, including those sustained by employees while at work, by passengers in getting on or off cars, by persons at highway crossings, by persons doing business at stations, etc., by trespassers, and others, bring up the total number of casualties, excluding "industrial accidents," to 21,865 (2,758 killed and 19,107 injured). The casualties are classified in Table No. 1, given herewith, which includes some details from Table 1B not here shown. (The accident statistics of electric lines are given in a separate table.) Supplementing the statement of railway accidents proper, the commission gives the following record of "Industrial Accidents"; those occurring to employees of the railway on railway premises in which the movement of cars or engines is not involved:

Industrial Accidents to Employees.

	Killed.	Injured.
While working on tracks or bridges	60	5,732
At stations, freight houses, engine houses, coaling stations, water stations, etc., where no moving railroad car or engine is involved	31	5,334
In and around shops	18	10,777
On boats and wharves	5	339
At other places	17	1,468
Total	131	23,650

Adding the casualties to employees in industrial accidents to the figures given in the larger table, the total number of employees killed, including those not on duty, is 840, and injured 34,907; and this makes the total number of persons killed, all classes, 2,889, and injured 42,757.

TABLE NO. 1A.—COMPARISON OF PRINCIPAL ITEMS WITH LAST QUARTERLY BULLETIN AND WITH ONE YEAR BACK.

	Bulletin 41.	Bulletin 40.	Bulletin 37.
1. Passengers killed in train accidents	65	21	63
2. Passengers killed, all causes	116	58	135
3. Employees (on duty) killed in train accidents.	104	107	209
4. Employees (on duty) killed in coupling	42	37	56
5. Employees (on duty) killed, total	626	512	869
6. Total, passengers and employees (items 2 and 5, above)	742	570	1,004
7. Other persons killed (including trespassers, nontrespassers, and employees not on duty), all causes	2,016	1,646	1,944
8. Employees killed in industrial accidents	131	87	132

The total number of collisions and derailments in the quarter now under review was 3,034, of which 176 collisions and 219 derailments affected passenger trains. The damage to cars, engines and roadway by these accidents amounted to $2,533,170, as shown below:

TABLE NO. 2.—COLLISIONS AND DERAILMENTS.

	Number.	Loss.	Killed.	Injured.
Collisions, rear	212	$207,118	13	386
Collisions, butting	164	242,163	33	855
Collisions, train separating	78	36,637	1	22
Collisions, miscellaneous	778	384,831	23	660
Total	1,232	$870,749	70	1,923
Derailments due to defects of roadway	303	$210,839	34	492
Defects of equipment, etc	831	699,060	17	257
Negligence of trainmen, etc	114	77,870	7	248
Unforeseen obstruction of track, etc.	88	122,894	12	121
Malicious obstruction of track, etc.	18	30,980	7	173
Miscellaneous causes	448	520,778	42	562
Total	1,802	$1,662,421	119	1,853
Total collisions and derailments	3,034	$2,533,170	189	3,776
Total for same quarter of—				
1910	3,130	2,871,501	303	3,352
1909	2,751	2,316,014	180	3,341
1908	2,567	1,950,408	176	2,729

The table of prominent collisions and derailments, with brief statements of causes, which heretofore has been given in each quarterly bulletin, is now omitted. In place of it a dozen pages are filled with accounts of 15 accidents which were investigated by the commission's inspectors during the three months covered by this bulletin. The *Railway Age Gazette* accident records for these three months were published on pages 315 (for July), 502 (for August), and 846 (for September); and notes were there given concerning the accidents here referred to, excepting the first (which is not a train accident) the fifth and the thirteenth. We copy from the bulletin the principal facts, relating to the causes of these 15 accidents, which have not been already published.

Boston & Albany, July 1, Post Road, N. Y. Automobile stopped on track in front of a train; three persons killed. This highway crossing was being used temporarily, because an adjacent crossing beneath the tracks was undergoing repairs; but the inspector says that a flagman should be stationed at the crossing "or some effective warning device be installed." Whether the accident occurred in daylight or darkness does not appear, but it is said that the engineman did not see the automobile until within 300 ft. of it. The highway approach to the crossing is on a steep grade, whether up or down is not stated.

Minneapolis, St. Paul & S. S. M., July 5, 5:50 a. m., Superior, Wis.; four employees killed, four injured. The conductor and engineman of a freight, who had been on duty 18 h. 50 min., forgot an order which had been delivered to them about nine hours before. This order required them to keep out of the way of

TABLE NO. 1.—CASUALTIES TO PASSENGERS, EMPLOYEES, AND OTHER PERSONS: JULY, AUGUST, AND SEPTEMBER, 1911.

	Passengers.		Employees on duty.		Employees not on duty.		Other persons not trespassing.		Trespassers.		Total persons.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Collisions	19	1,304	45	591	1	9	1	16	4	3	70	1,923
Derailments	46	1,270	49	513	5	7	...	27	19	36	119	1,853
Accidents to trains, cars, or engines, except collisions, derailments, and boiler explosions	...	43	7	183	1	4	...	9	1	4	9	243
Bursting of, or defects in, locomotive boilers or boiler attachments	...	...	3	264	...	...	...	...	...	...	3	264
Total train accidents	65	2,617	104	1,551	7	20	1	52	24	43	201	4,283
Accidents to roadway or bridges not causing derailment, such as fires, floods, landslides, explosions, etc.	...	...	...	8	1	...	4	...	1	...	6	8
Coupling or uncoupling cars (does not include accidents with air or steam hose)	...	...	42	697	...	1	...	...	...	...	42	698
While doing other work about trains (not in shops or engine houses) or while attending switches	...	...	42	4,402	...	...	...	...	...	...	42	4,402
Coming in contact, while riding on cars, with overhead bridges, tunnels, or any signal apparatus, or any fixed structure above or at the side of the track	5	13	15	357	...	5	...	1	19	23	39	399
Falling from cars or engines	14	94	94	1,246	4	12	10	21	122	180	244	1,553
Getting on or off cars or engines	23	727	29	1,869	9	62	5	39	167	542	233	3,239
Other accidents on or around trains not here named	1	1,036	4	283	...	25	2	135	9	85	16	1,564
Being struck or run over by engine or car at stations or yards	5	30	142	304	24	29	37	74	309	278	517	715
Being struck or run over by engine or car at highway grade crossings	...	...	...	...	...	2	290	697	19	27	309	726
Being struck or run over by engine or car at other places	1	...	144	167	38	13	17	25	846	402	1,046	607
Other causes	2	234	10	178	...	26	10	373	41	102	63	913
Total, other than train accidents	51	2,134	522	9,511	76	175	375	1,365	1,533	1,639	2,557	14,824
Grand total	116	4,751	626	11,062	83	195	376	1,417	1,557	1,682	2,758	19,107

a work train. On this line there was no telegraph office for a distance of 107 miles, and the train despatcher is censured for issuing an order which gave to this train the right to the road for a trip which obviously could not be completed within 16 hours—the time beyond which it would be illegal for the men to remain on duty. The inspector recommended that the railway be prosecuted for violation of the hours-of-service law, and also that the telegraph or telephone facilities be made adequate.

Oregon Trunk, July 10, Dyke, Ore.; derailment due to excessive speed on a curve of 11 deg., the alinement of the track being defective; five passengers killed, 30 passengers and five employees injured. The limit of speed prescribed by rule was ten miles an hour; actual speed 30 miles an hour. Nothing said about the age, character or circumstances of the men in charge of the train, or of the degree of fault in the track.

New York, N. H. & H., July 11, Bridgeport, Conn.; derailment of passenger train due to excessive speed. This accident, together with the government inspector's report on it, has already been noticed (pages 90, 316, 360, 374).

Baltimore & Ohio, July 14, Harper's Ferry, W. Va.; derailment of passenger train. Investigated July 27, because of the receipt of a complaint alleging defective road bed. The cause of the derailment was not discovered. The speed of the train was 30 miles an hour, and there was no evidence that this was excessive.

Seaboard Air Line, July 27, Hamlet, N. C.; butting collision, passenger train and freight; ten passengers killed, 262 passengers and five employees injured. Hamlet is a division point, and the division on one side is controlled by one despatcher, and that on the other side by another, both working in the same room. One of the despatchers sent a message to the freight train (on his district) allowing it to run a short distance over into the next district, and this message was sent without first consulting the other despatcher and receiving correct information as to whether or not the line was clear. Permission to allow a freight to run over into the next district in this way had been given frequently by telegraph, so as to make it unnecessary for the freight to stop at the foot of a heavy grade to examine the train register. This despatcher had been in the service over seven years, and he was considered reliable and competent.

Bangor & Aroostook, July 28, Grindstone, Me.; butting collision of passenger trains; five passengers and three employees killed, 40 passengers and three employees injured. This collision occurred at 9:10 p. m.; the train at fault, the second section of a regular passenger train, started from Millinocket at 8:58 p. m., when it was obliged to reach Grindstone (nine miles) at 9:09 p. m. The engineman was killed. The conductor, before reaching Grindstone, saw that he was encroaching on the time of the other train, yet took no action, saying that he relied on the judgment of his engineman. (As noted in the *Railway Age Gazette* of February 23, this conductor has been fined $500 and sentenced to imprisonment for 60 days.)

Pennsylvania (West of Pittsburgh), August 13, Fort Wayne, Ind.; derailment due to excessive speed; four employees killed, 57 passengers and four employees injured. This accident has already been noticed (pages 346, 502, 836, 1351).

Cleveland, C. C. & St. L., August 18, Columbus, Ohio; derailment of passenger train at a disconnected switch. Our account of this accident (page 502) gives details not shown in the government report. The bulletin says that the signalman had been in service only two and one-half months, and had had "no previous experience as a towerman or interlocking operator."

Lehigh Valley, August 25, Manchester, N. Y.; derailment caused by broken rail; 27 passengers and one employee killed, 59 passengers and four employees injured. This accident has already been noticed, pages 444, 502, 627; also February 16, 1912, pages 267, 280.

Pennsylvania, September 4, Dock Junction, Pa.; this collision occurred on the Lake Shore & Michigan Southern, but it is reported under the head of Pennsylvania. A passenger train of the Pennsylvania ran into a freight of the Lake Shore at a crossover. One passenger and two employees were killed, and 30 passengers and six employees injured. The passenger train ran past a distant and a home signal, which were set against it. The engineman appears to have been killed, although the report does not say so. He was a man 63 years old, of good character and habits, and had left home in the morning apparently in good health, but he had disregarded signals on this same trip, and the fireman had been compelled to stop the train. This fireman, in service on this division seven years, and on this train six months, is censured for not having taken charge of the engine when the engineman failed to obey the signals approaching Dock Junction.

Minneapolis, St. Paul & S. S. M., September 5, Fremont, Wis.; derailment of passenger train; one employee and two trespassers killed, two employees and 25 passengers injured. This was due to the malicious misplacement of a switch by a boy 15 years old.

Chicago & Northwestern, September 11, Oakfield, Wis.; butting collision of freight; nine employees injured. A freight train was side-tracked to meet two opposing extra trains. While on the side track all members of the crew went to sleep. After one of the extras had passed, the train started out and met the second one. These men had been on duty eleven and a half hours.

Lake Erie & Pittsburgh, September 13, Cleveland, Ohio; derailment of a work train; two laborers killed, 16 injured. This was a new road not yet opened for traffic. The derailment was due to excessive speed on new track. The conductor had been warned, by word of mouth, that the track was defective at this point, but the information was not given to the engineman. The train was running backward. The conductor had been engaged in this work four days, but the engineman and fireman had only made one or two trips over the road.

Pennsylvania, September 25, 1 a. m., Larimer, Pa.; butting collision of eastbound passenger and westbound freight; one employee killed, 4 injured. These trains had to cross each other's routes, using adjacent crossovers (a four-track railway). The freight was running at low speed and the passenger had nearly or quite stopped. The signalman operating the switches and signals became confused (apparently because of the unexpected appearance of the passenger train after he had given a route to the freight) and took away the route from the passenger after the passenger engineman had accepted it. This appears to have been done after the freight had passed its home signal, and it appears that the engineman of the freight was not keeping a good lookout. The inspector observes that approach locking by track circuits would have prevented the mistake of the signalman. This signalman had been at this place less than two months, but had had experience elsewhere. The inspector's report omits many details, so that a complete account of the accident cannot be made.

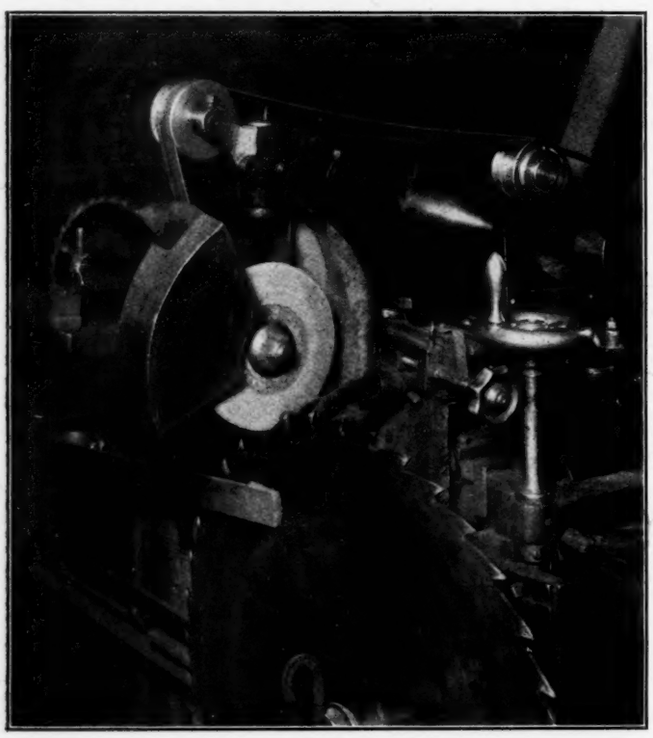
Electric railways reporting to the commission (not included in the foregoing statistics) had 108 persons killed during the quarter and 1,355 injured; and there were 36 collisions and 26 derailments. Train accidents are charged with only 3 fatalities —1 passenger and 2 employees killed in collisions. The total number of passengers killed from all causes was 9, and of employees 27 (10 in industrial accidents). The number of trespassers struck or run over by cars was 58; 27 killed and 31 injured.

Defending the organization of the Saxon State Railways the Minister in charge said that since 1901 while passenger traffic has increased 46 per cent. and freight traffic 35 per cent., the number of employees in the administrative service has decreased nearly 10 per cent.

PREVENTION OF INDUSTRIAL ACCIDENTS.

The Pennsylvania Railroad has in the past year reduced the industrial accidents in its shops from 8.7 to 3.5 per 1,000 employees in a month. Industrial accidents are those which result from the use of machinery and include everything from a scratched finger to a broken head. This road was recently awarded a medal, as the American employer, who during the year, in the judgment of the American Museum of Safety, did the most for the protection of the lives and limbs of its workmen by means of safety devices for dangerous machines and processes.

The officers of the Pennsylvania Railroad began a vigorous campaign of education among the employees in November, 1910. At the same time experts were employed to inspect the larger shops to see where safety devices could be installed to reduce the chances of accidents. Motive power inspectors of the railway accompanied the experts on their inspections. The resulting benefits were so marked that the making of industrial inspections of shops has become a fixed policy. Since the adoption of the plan 66 shops have been inspected. Reports were made to the general manager, and practically all of the recommendations offered have been adopted. The following data shows what has been accomplished.



Safe-Guard on Emery Wheel for Sharpening Circular Saws.

Month (1911).	Number of shop employees.	Killed.	Serious injuries per 1,000 employees.
January	34,127	4	8.7
February	34,171	7	7.3
March	32,899	0	8.3
April	31,380	1	6.0
May	34,694	3	7.9
June	34,601	1	5.2
July	31,641	2	4.7
August	32,512	2	3.4
September	32,932	0	3.4
October	33,462	0	3.2
November	33,997	2	3.5

The reports resulting from the inspections contained 3,126 recommendations covering improvements or changes in 3,737 tools or machines, at an estimated cost of $35,000, or an average of $530 for each shop. In many cases it was not that expensive. At one shop for which 238 recommendations were made, 157 covered improvements which were made with practically no cost. Shopmen have most at stake in the accidents and the organization of shop safety committees of the rank and file has proved invaluable. The prevention of industrial accidents depends largely on the care exercised by the individual workman. By serving on the safety committees they become interested in precautions and will instinctively avoid many of the common and preventable dangers. Even laborers serve on these committees.

A terminal division committee is composed of a locomotive inspector, brakeman, baggage porter, track foreman, yard foreman, usher and relief assistant trainmaster. A road and yard committee is composed of a passenger engineman, freight conductor, inspector of car repairs, telegraph operator and a laborer. These are standing committees, the members of which are changed from time to time. The recommendations they make are simple and cover a wide range of subjects, such as criticisms of a somewhat general character referring to recommendations for coaming strips for shop elevators, stairways and floor openings; protection for exposed gears, band saws and exposed set screws; safeguarding of all belts and pulleys; conduit for wires from rheostat boxes; protection for counterweight chains; boxing of weights and installation of guard rails at points where workmen may be exposed to belting or moving machinery. The Pennsylvania Railroad announces that its efforts to reduce industrial accidents will be redoubled in the present year.

TRESPASSERS KILLED ON RAILWAYS—WHO ARE THEY?

BY FRANK V. WHITING,
General Claims Attorney, New York Central Lines.

Recent writers have stated that probably there are no fewer than 500,000 tramps in America. When we realize that they arrive at this number by taking as a basis the number of trespassers on railways killed, and multiply this by the figure representing the proportion of trainmen killed in a year to the total number of trainmen employed, we see how unreliable such figures are. As a matter of fact, trespassers come from all walks of life, and the statement that was recently made by Orlando F. Lewis, that from one-half to three-quarters of trespassers are vagrants, is without foundation. Mrs. Alice Willard Solenberger, in a book recently published by the Russell Sage Foundation, entitled "One Thousand Homeless Men," criticises the customs of railway officials in designating as "tramps," that very large body of men that "beat" their way about the country, and she refers to thousands of bona fide workmen, who, at certain seasons of the year are needed in a particular section of the country in large numbers. She states that these seasonal and shifting workmen are not tramps and should not be classed as such; and neither should other men, who with a legitimate purpose are on their way to a known destination, nor should those others who are only accidentally or quite temporarily upon the railways be so classed. She further states that to class these men as "tramps" is not only unfair to the men, but confuses the discussion regarding either homeless men or tramps. From her investigation she decided that 220 out of one thousand, or less than 25 per cent., were tramps.

Being impressed with the lack of information on the subject, and also by the assertions made with regard to tramps on railways, I deemed it profitable to secure some authoritative data, and to this end have examined reports of accidents resulting in the deaths of one thousand trespassers. The results are interesting as well as enlightening.

It is many years since the word "tramp" escaped from the vocabulary of most railway officials, and was superseded by that very sensient substitute, "hobo." A tramp means one who walks from place to place, either idly or in search of work; specifically, "an idle wanderer." "Hobo" is defined as an idle, shiftless, wandering workman, ranking scarcely above a tramp.

Among most railway men the hobo is a typical tramp, especially to those who come in contact with the trespasser problem

through the investigation of accidents resulting in injury or death of persons generally. However, neither the word "tramp" nor "hobo" is used, except in a very restricted sense, when applied to some person who is in fact a hobo or tramp. These words, however, are not used to designate that large class of persons who walk upon the tracks or "beat" their way upon railway trains, but such persons have for years been classed as trespassers.

The Interstate Commerce Commission reported that during the fiscal year ending June 30, 1911, 10,396 persons were killed upon railways, and this number includes those who were instantly killed or died within twenty-four hours from the time of accident. Of these, 5,284 are designated as "trespassers." It is a significant fact that, of the number of trespassers killed, practically 80 per cent. or 4,125 are shown as having been "struck by engine or car," in other words were walking or standing upon the tracks; 520 were killed in "getting on or off cars and engines," 1,043 "while on trains," and 116 from "other causes."

There are many trespassers on the tracks of railways who are regularly employed and who make it a practice to use the right-of-way between streets or highways in going to or from their work. The tracks are also used to a considerable extent by pedestrians when public highways are wet and muddy, or difficult to walk upon.

We found that of 1,000 persons killed while trespassing, 489 resided near the place of accident; 321 resided at a place distant from where the accident occurred; and the residence of the balance, 190, was not ascertained.

The conjugal state of the decedents has some bearing upon this question; and it is interesting to note that of these trespassers, 273 left widows or children, 33 were widowers, 376 single, and the family connection of 318 unknown. Further, 369 were living with their families or parents, 301 were not living with their families or parents, and 330 could not be classified in this respect. When we consider that many young men employed in our larger cities have left home and are boarding, and that among the trespassers there is quite a number of foreigners who come to this country without their families, it is not strange that so large a percentage should be found not living with their families or parents. Another thing that indicates clearly that the large majority of trespassers are not tramps in any sense of the word, is that 598 of the thousand referred to were self-supporting (388 were known to be regularly employed), and 105 were not self-supporting. This information was not obtainable as to the balance.

The age by groups are of interest: 68 were 15 years and under; 340 were 16 to 30 years old; 451 were 31 to 60 years old; 69 were over 60 years old; 72 were of unknown ages, all these being adults.

With reference to nationalities we found that 468 were Americans, including 3 Indians and 18 negroes. In 174 cases the nationality was not reported, but in the rest we find that no less than twenty-four foreign countries contributed their quota to this regiment of trespassers who trespass no longer.

The occupations of those killed and the number employed in each warrants detailed mention. These were as follows:

349 Unknown.	18 Merchants, salesmen and agents.	5 Soldiers.
19 None.	2 Coachmen and chauffeurs.	8 Sailors.
70 School children and students.	3 Linemen.	31 Railway trainmen and other employees.
268 Laborers.	3 Cigarmakers.	3 Musicians.
44 Farmhands.	3 Nurserymen.	1 Teacher.
1 Minister.	81 Shopmen and mechanics.	2 Fishermen.
1 Actor.	2 Barbers,	1 Patrolman.
1 Inmate asylum.	1 Contractor.	2 Shoemakers.
10 Engineers.	3 Bakers.	4 Horsedealers.
1 Chemist.	2 Messengers.	4 Lumbermen.
4 Clerks		3 Watchmen.
6 Hotelmen and bartenders.		8 Miners.

Then, there were in addition six small children and thirty women.

It is thus readily seen that not only from more or less actual knowledge, but by a definite process of elimination we learn that many of these unfortunates were neither tramps nor hoboes, and, in fact, we are justified in saying positively that 764 were not hoboes and 50 were, and that the status of the rest was not determinable.

Deaths are occasionally brought about by intention on the part of the decedents, and the information at hand shows that 15 of the cases were reported as suicides. Intoxication contributed to a large extent to the number of deaths, there being 93 cases reported due to this cause; at least the men killed were intoxicated at the time. In 708 cases the trespassers were not intoxicated, and in the rest the condition in this respect was not known.

Mrs. Solenberger says: "It is the mere accessibility of the railways more than anything else, I believe, that is manufacturing tramps today. So long as it is possible for practically any man or boy to beat his way about the country on the railways, we shall continue to have tramps in America. When we succeed in absolutely closing these highways to any but persons having a legitimate right to be upon them, we shall check at its source the largest single contributory cause of vagrancy, and the problem of the tramp, as such, will practically be solved. As an unemployed, untrained, sick or irresponsible homeless man he will still need attention, but this can be given him with incomparably less difficulty when once he is deprived of the facilities he now has for wandering from one place to another."

Considerable has been said of late with reference to laws against trespassing. Very few of the states have laws specifically directed against trespassing on railway tracks, and usually laws with reference to trespassing on trains are mild in form and not very often enforced. A great deal of difficulty has been experienced from time to time in getting magistrates to prosecute offenders in this respect.

Mrs. Solenberger suggests: "If the migration of tramps could be controlled, as already suggested, under some sort of federal interstate commerce law, the problems might perhaps be solved, but it is most unlikely that these vagrants can be dealt with by the national government until long after individual states have discovered how best to deal with them locally. Students of the problem now generally believe that little progress can be made by any state until the responsibility for the treatment of the tramp is assumed by the state as a whole; until the laws which affect him are state laws; until the cost of his arrest and punishment or treatment is met by the state, and not by counties or cities within the state."

It has been suggested from another source that Congress pass a law prohibiting trespassing on interstate railways; and this suggestion is an excellent one and should receive serious consideration.

However, it is evident from the information shown above that, after all, the problem is not so much one of dealing with tramps or hoboes, but with trespassers, who in many instances are regularly employed, well-to-do and respected citizens of our towns and cities, and that so far as the prevention of accidents to trespassers is concerned, the problem is largely a local one and wholly within the hands of the local authorities.

Notwithstanding the revolution in China train service over all but the last 5 miles of the extension of the Sunning Railway in Kwangtung province, China, to Kongmoon has been commenced. The last 5 miles, which are being constructed through swamp and rice fields, and require considerable filling, will be completed immediately. The road will then be 67½ miles long and will reach from the river port of Kongmoon into the interior of one of the richest portions of the Pearl river delta. Its equipment at present consists of 7 American and 5 German locomotives, 18 passenger coaches built in America, and about 70 box cars and about 70 flat cars, most of which were built in the United States. The extension of the railway north from Kongmoon and eventually to Canton and south from Sunning City to the sea is to be undertaken as soon as affairs in this portion of China return to normal.

DECISION OF THE COMMERCE COURT IN THE LOUISVILLE & NASHVILLE CASE.

The decision of the United States Commerce Court, in the suit of the Louisville & Nashville, asking the annulment of the order of the Interstate Commerce Commission reducing freight rates from New Orleans, La., to Montgomery, Ala., and other places, was noticed in our last issue, page 403. The complete decision in the case, which was heard before the full court, makes a pamphlet of 49 pages. The case is No. 4, decided February 28, 1912. The decision is written by Judge Archbald. A dissenting opinion was presented by Judge Mack, but this has not yet been published.

In brief, the court decided in favor of the Louisville & Nashville on the ground that the commission had ordered a reduction of rates without first having before it proper evidence that the former higher rates were unreasonable. Following are the principal points of the decision.

Prior to 1907, for many years, the rates on certain classes of freight from New Orleans to Montgomery, Selma and Prattville were higher than from New Orleans to Mobile, an intermediate point, plus the rates from Mobile to Montgomery, etc. The same conditions prevailed by way of Pensacola. The rates to Mobile and Pensacola were low because of water competition, but the water competition had been killed off several years ago. In 1906 the commission ruled that a through rate higher than the combination of intermediate rates would be regarded as prima facie unreasonable. Following this ruling the Montgomery freight bureau complained of the rates on certain classes and commodities. Influenced by this complaint and by the ruling of the commission, the railway on August 13, 1907, advanced its rates from New Orleans to Mobile and Pensacola on certain classes. This action, with reductions on a number of articles by giving them commodity rates, satisfied Montgomery. But, soon after, the New Orleans board of trade complained that the advances to Mobile and Pensacola were unreasonable; that the rates to Montgomery, etc., were unreasonable in themselves and also as compared with rates from Memphis, St. Louis and Louisville. The railway denied the charges, but before the commission held a hearing it voluntarily established commodity rates meeting some of the complaints, especially as regards those based on competition with Memphis.

The commission reported on the New Orleans cases November 26, 1909, condemning the advances to Mobile and Pensacola on the class rates and directing the restoration of the rates in force prior to August 13, 1907; and it declared the rates to Montgomery, etc., unjust, insofar as they exceeded the sum of the locals to Mobile and from Mobile. The rates which were so prescribed to Mobile and Pensacola were the same in each case as the rates which had existed prior to the advance made by the company, and the rates to Montgomery were exactly equal to the rates to Pensacola and Mobile as so restored, plus the rates from these places to Montgomery, which remained unchanged; the rates to Selma being made up in the same way, and those to Prattville having the prevailing arbitrary added. The railway appealed to the federal court in Kentucky. The court refused to grant a preliminary injunction, and the order went into effect and was complied with.

In the suit before the court the entire testimony and proceedings before the commission were made a part of the record, though the commission objected to this action, on the ground that its order, having been made after a full hearing, upon due consideration of the issues involved and in the exercise of its statutory authority, was not open to question. The case was not tried in Kentucky, but was transferred to the Commerce Court. There were many matters at issue, but the only one which the court deems necessary to pass on is whether the commission has not in a legal sense acted, as charged, in such an unreasonable manner that its order is invalid, having nothing of substance or persuasive force upon which it can rightly be predicated. This is claimed by the road to result because the reasons assigned in the report either do not justify the conclusion reached or are so at variance with the undisputed facts that effect has plainly not been given by the commission to the evidence which was produced before it. Stated in another form the question is whether this order, tested by the principles recently emphasized by the Supreme Court in *Interstate Com. Com.* v. *Union Pacific*, decided January 9, 1912, should not be set aside because there was no substantial evidence to sustain it. That is to say, whether the commission, while in form acting within the authority conferred by the statute, has not in effect disregarded it.

If the conditions had been as the commission describes them, the decision of the court would have been in favor of the commission's order, and "though there might have been a doubt as to the correctness of the commission's conclusion, nevertheless there was room for difference of opinion, and in such case the conclusions of the commission should be accepted. . . . The evidence has been read and re-read with the utmost care," and the court is unable to see how the commission's opinion could have been formed.

The statute (Section 15) requires the commission to find existing rates unjust and unreasonable before proceeding to prescribe future rates. There must be due notice and a full hearing. The hearing which is so provided for is not a perfunctory one. The carrier is entitled to know and to rely on what is adduced at it, either for or against the existing rate, and the commission is not authorized to disregard it and reach a conclusion not at all justified by it. If the rate attacked is shown to be unjust, it may be abrogated and a new one established. But if that is not the outcome of the hearing and on the contrary it is clearly shown that the rate is not unjust, the evidence as to this cannot be put aside, and if it is, and the commission without reference to it proceeds to condemn the rate and to fix another, its action is invalid.

After the most careful consideration we are forced to conclude that the action of the commission in the present instance is of that character. Having regard to the evidence, the only tangible ground upon which it will be found to rest is the fact that there had been an advance in the rates to Pensacola and Mobile, and that the Montgomery rate exceeded the sum of the rates through these points as they stood prior to this increase, making the increase in these intermediate rates the only proof of unreasonableness, not only as to Pensacola and Mobile, but Montgomery also. And if the reduction to Mobile and Pensacola was a mere restoration of the rates previously in force, based solely on the advance made by the railway, it is equally indefensible. And, taking the case as it stands, there is practically nothing else, as it seems to us, that can be made out of it. Not but that other reasons are given by the commission. But it will be found upon examination, either that they are entirely unsupported by the evidence or are involved in such capital mistakes with respect to it, or are in themselves so inconsequential as to the reasonableness or unreasonableness of these rates, that nothing can be consistently predicated upon them. And this we will now endeavor to demonstrate.

The original rate from New Orleans to Montgomery was based on a decision of Hon. Thomas M. Cooley, in 1886, who acted as arbitrator, at the request of the railways, on the general situation in southeastern territory. Judge Cooley virtually affirmed rulings which had been made by James R. Ogden, commissioner of the associated railways. In this decision the rates from New Orleans were made four cents less than from the Ohio river. Later, when a new road was built from Memphis to Birmingham, a reduction was necessary. The final adjustment was made in 1896. This judgment of Judge Cooley, basing rates on "what the traffic will bear," and which was accepted by the business public for 14 years, is accepted by the court as reasonable. Nothing militates against it except the water rates from New Orleans to Mobile and Pensacola. The through rates to Montgomery now fixed by the commission are nothing more than the restored competitive Mobile and Pensacola rates plus the pre-

vious rates from those places to Montgomery. There is one trifling exception, Class E. All the rates affected have to stand or fall together. It is true that there are other reasons assigned by the commission in its report for the reduction in the New Orleans-Montgomery rates, but, with due respect to the commission, they do not bear up under examination. The commission refused to be guided by the Cooley arbitration, holding that it had been set aside by the changes in conditions, but the record, as the court reads it, does not warrant this conclusion. The changes had been mainly, or wholly, in commodity rates, whereas the rates now changed by the commission are class rates. These class rates have continued undisturbed so long that they must be assumed to have been equitably adjusted. Some articles had been taken out of the classes from time to time and given commodity rates, but there is no evidence that the class rate adjustment was unfair to New Orleans.

The railway claimed that between points where the through rate exceeded the combination of locals, shippers had been given the benefit of the combination rate, and the commission took this into consideration; but the court finds that these concessions on the part of the road had not been enjoyed by shippers in New Orleans sending freight to Montgomery. New Orleans had sometimes shipped locally to Mobile and then reshipped to Montgomery, etc., but this was done without the co-operation of the road.

And the acceptance on other parts of the system of combination rates which were lower than through rates had no tendency to show that these particular rates were unreasonable. In short, when the undisputed facts regarding this feature of the case, as they appeared before the commission, are taken into account, they not only do not sustain the conclusion of the commission, but seem to be rather of contrary import.

The merchants of New Orleans had previously made ineffectual efforts to secure better rates to Montgomery, etc., but before the commission had finished hearing this case, these grievances had been met by reductions and adjustments which favored New Orleans as compared with Memphis. This was recognized by the commission, as it made no order respecting commodity rates; and as to the class rates, New Orleans has had an actual advantage over towns on the Ohio and upper Mississippi rivers. These facts, instead of sustaining the commission, tend to a contrary conclusion. Again, the commission makes comparison with rates from Savannah, Charleston, and other eastern and northeastern cities, but the court rules out this comparison, because it takes an entirely different territory where there is no evidence that the traffic conditions are at all similar. The commission is criticized also for introducing other comparisons equally irrelevant. And why did not the commission make comparison with the rates established by the railway commissions of Alabama and Georgia? The court here presents a table, reproduced below, showing that for 141 miles, which is the distance from New Orleans to Mobile, rates made by the state commissions, as well as numerous interstate rates made by the railways, are higher, and in most cases much higher, than those from New Orleans to Mobile.

	Class—						
	1	2	3	4	5	6	E.
Louisville & Nashville rates from New Orleans to Mobile, 141 miles	50	39	38	31	27	16	20
Southern Railway rates fixed by commissions of Alabama and Georgia for 141 miles	75	63	56	44	35	29	35
Minimum or standard tariff of Georgia Railroad Commission, 141 miles...	60	50	45	35	28	23	28
Southern Railway rates in Tennessee, 141 miles	58	50	46	37	31	27	32
Southern Railway rates in South Carolina, 141 miles	62	52	42	39	31	24½	31
Southern Railway rates, Chattanooga to Birmingham, 143 miles	57	49	41	32	27	19	27
Southern Railway rates Birmingham, Ala., to Columbus, Ga., 157 miles	57	49	45	35	28	22	27
Southern Railway rates, Chattanooga to Atlanta, Ga., 138 miles.....	52	45	41	32	25	20	27

"Let us not be misunderstood upon this point. We recognize, of course, that comparisons are very commonly made in the investigation of rate cases, and that they may often be quite persuasive. The competency of such evidence is not questioned nor the right of the commission to give it due weight. Neither is it doubted that the commission may receive evidence of this kind, giving to the facts so shown their proper value, without proof of similarity of conditions. But what we do hold is that the comparisons made by the commission in its report in this case, taking into account all the facts and circumstances disclosed at the hearing, had no evidentiary bearing upon the reasonableness of the rates in dispute, and therefore furnish no appreciable support of the commission's conclusion."

The commission also made comparisons of the rates per ton per mile, taking an average of the first six classes, showing that this average was higher from New Orleans to Montgomery than from St. Louis and other points; but it is the ordinary rule that the ton-mile rate shall decrease as distance increases, other things being equal; so this comparison is rejected. Finally, the commission says that shippers of certain kinds of goods—naming them—had testified that they were unable to trade in the Montgomery territory on account of the high rates, but the evidence shows that this complaint was based on the former conditions existing before the road made the reductions and adjustments already mentioned; as to the class rates, to which the commission's order is confined, there is no evidence to sustain the observations made by the commission with regard to this claim of the New Orleans shippers.

Here the court goes on to abstract at considerable length the testimony of 11 shippers, naming them; and in each case it is found that the testimony does not support the conclusions of the commission. "Considered severally or collectively, this evidence contains nothing which we can discover that supports the conclusions of the commission with respect to the Montgomery rates, outside of the fact that, if the reduction is to stand to Pensacola and Mobile, it calls for a reduction to Montgomery to equalize the sum of the locals. It is not simply that the weight of the evidence does not sustain the reasons assigned by the commission in its report, but that there is no substantial basis for those reasons in the testimony passed upon."

The Mobile and Pensacola rates remain to be considered. The mere fact that they were increased by the company created no presumption that they were not fair and reasonable, nor was the commission justified in putting them back to what they had been without regard to whether they could be presumed reasonable. The rates for the third, fourth and fifth classes, under which most of the freight moved, were lower than the rates by water, notwithstanding which the commission proceeded to reduce them to their former low basis, making them 6, 9 and 8 cents, respectively, below the water rates. The court also accepts the argument that the reductions on these class rates are inconsistent with each other, some being much larger in proportion than others. Inconsistencies had existed in former rates, but this was no justification for this act of the commission. The commission says that the Mobile and Pensacola rates had remained unchanged for 20 years, and that there was no evidence that they had not been compensatory. But at the time this statement was made the rates in force were the higher ones, established in 1907, and it was the unreasonableness of these new rates which was at issue and which the complainants should have been made to show. There was no adverse presumption to be indulged because of the increase; neither was a voluntary rate established to meet competition to be taken as the measure of what is reasonable. And yet that is what the commission did. This was wrong, for at that stage of the proceeding it was not incumbent on the railway to show that the former rates had not been compensatory. Rather, the burden was on the complainant to show that the rates as they stood were unjust and unreasonable. The argument presented to the court in behalf of the commission was that a rate, however low, cannot be condemned if it gives any return above the cost of service. This proposition the court will not accept.

The commission declared that the rates to Mobile exceeded

the rates to Natchez, Vicksburg, etc., but "this clearly is not true" says the court. It may be that the commission had in mind the rates as raised by the railway, but even then the statement is not true, except with respect to the third, fourth and fifth classes. Again, the commission says that these rates exceeded rates from Nashville and for other similar distances, but no tariffs are quoted to sustain this conclusion, whereas there is evidence, uncontradicted, that with regard to a large number of rates from Nashville, etc., the fact is just the opposite.

Another ground taken by the commission to justify its action is that between New Orleans and Mobile the westbound rates were the same as the eastbound, but this is held to have no bearing, especially in view of the fact that there was a preponderance of empty cars moving westward.

The commission says that the advances made from New Orleans to Mobile were severely felt by certain shippers; but this is not a sufficient reason for holding the rates unjust. Any advance would be felt, of course. New Orleans wished to compete in Mobile with Mobile jobbers, and Mobile desired to compete in New Orleans with New Orleans jobbers; but, of course, a railway cannot be required to meet such a demand to virtually abolish the cost of transportation. Other arguments of this kind are found to be based on mistaken statements of fact. The court here goes on to quote at length and analyze the testimony of a half dozen shippers and jobbers, finding, as in the case of the Montgomery complaint, that the testimony was irrelevant or had been wrongly construed.

All this was in relation to the rates to Mobile; and the case of Pensacola was no different except that it was still weaker. The commission says that the New Orleans merchants shipping to Pensacola did not suffer so much as those shipping to Mobile, but that they strongly protested against the advance. The court says that there is nothing in the evidence to sustain the statement that the results at Pensacola were like those at Mobile. One paper dealer said that he would be affected at Pensacola the same as Mobile, "but he is not affected at all at Mobile and therefore cannot be at Pensacola."

Opposed to all of these claims of the shippers is the testimony of witnesses produced by the railway to the effect that these rates are less than those usually charged by the company and by other railways; that before being cut down by the commission they permitted a free movement of traffic; that no competitive conditions called for a reduction, and that the reduction gave New Orleans an undue advantage over Vicksburg, Memphis and other places. Also it is shown that the line from New Orleans to Mobile along the Gulf coast is costly to operate, long trestles and bridges being frequently damaged by floods and storms; the territory is so sparsely settled that the road depends for profit on the through business, and has never received even a fair return from its operations; and, finally, the increase in wages and in prices of material in the last few years makes the order of the commission very unjust.

Counsel for the commission and for the government made no reply to this, simply relying on the authority of the commission to determine what is a reasonable rate, and claiming that the courts could afford no relief unless the rate fixed could be shown to be confiscatory. This contention cannot be accepted. "In our judgment, it was never intended to confer on the commission any such unrestrained and undirected power. As already pointed out, the law provides for a hearing and it must be more than a shadow. Both parties are entitled to be confronted with the evidence on which the case is to be determined, and the conclusion reached must be a reasonable inference from the facts disclosed by the investigation. This conclusion is held to be entirely justified by the recent decision of the Supreme Court in the case of the Interstate Commerce Commission against the Union Pacific.

"Tested by the principles laid down in that decision, we are of opinion that the order here drawn in question must be held invalid as exceeding the delegated powers of the commission, because there was no substantial evidence to sustain it. It is not merely that the evidence preponderates in favor of the reasonableness of the rates which have been cut down. Concededly, that would not be enough to challenge the action of the commission. Not only is the commission vested with a discretion which cannot be disturbed, and which we intend unqualifiedly to respect, but it is entitled to select the testimony which it will believe and rely upon, according as it addresses itself to the discriminating judgment of the commission. But it is not within the authority of the commission to reduce the rates in this or any other case not merely against the weight of the evidence produced to sustain them, but without anything substantial to warrant the conclusion reached or the reasons assigned therefor. And this we are convinced is a case of that character. The only discoverable basis for condemning the rates to Mobile and Pensacola is the fact that they had been advanced in 1907, and this of itself was clearly not sufficient. *Interstate Com. Com.* v. *Chicago Great Western*, 209 U. S., 108. If the long continuance of lower rates to these points or the circumstances connected with their increase called for explanation, as suggested in the case cited, the explanation made by the carrier, in the absence of anything to discredit it, must be held to sustain the advance as against any presumption that it was unreasonable, and therefore there was nothing substantial to support its condemnation. Nor is there anything of substance to sustain the reduction of the Montgomery rates except the fact that they exceeded the former combination on Mobile and Pensacola. Outside of these facts, having regard to the undisputed evidence adduced at the hearing, the existing rates were not shown to be unjust or unreasonable and there was therefore no valid basis for the commission's conclusion. The petitioner is therefore entitled to a decree annulling the order."

PASSENGER CAR LIGHTING.

The Special Committee on the Relations of Railway Operation to Legislation has issued Bulletin No. 27, relating to the methods used in lighting passenger cars. The figures given are based on replies received from 200 railways having a mileage of 227,089 miles and operating 54,961 passenger cars.

Table I shows the methods of lighting for each class of cars, and Table II gives the totals and percentages for each method. The latter figures indicate that of the total equipment now in service 29.7 per cent. is lighted exclusively with oil, and 36.7 per cent. exclusively with gas. Where auxiliary systems are used, 7.8 per cent. is lighted with oil, 10.5 per cent. with gas, 13 per cent. with electricity, and 1.9 per cent. with acetylene.

TABLE I.—METHOD OF LIGHTING PASSENGER CARS IN SERVICE NOVEMBER 1, 1911.

		Oil Only	Gas Only	Electricity Only	Acetylene Only	Carburetor System	Oil and Electricity	Gas and Electricity	Acetylene and Electricity	Oil and Gas	No Lights.	Total
1.	Postal	132	594	377	9	1	121	136	20	304	.....	1,694
2.	Combination mail and baggage	1,744	798	88	75	73	222	16	21	316	.....	3,353
3.	Baggage and express	2,830	2,729	283	96	360	330	82	19	557	64	7,350
4.	Comb. (Pass. and baggage / Pass., mail and bag. / Pass. and mail)	2,272	1,521	342	192	127	56	32	34	103	.....	4,679
5.	Coaches	8,619	12,159	2,010	707	574	1,167	701	359	530	3	26,829
6.	Parlor, sleeping and dining	256	2,195	3,183	24	.....	283	2,642	505	44	2	9,134
7.	Business and instruction	225	170	79	29	14	59	255	15	48	.....	894
8.	Motor	242	22	531	96	1	109	.....	10	.....	.....	1,011
9.	Miscellaneous	17	.....	.....	.....	.....	.....	.....	.....	.....	.....	17
10.	Total	16,337	20,188	6,893	1,228	1,150	2,347	3,864	983	1,902	69	54,961

Taking the total number of cars reported, including those with auxiliary lighting, 37.5 per cent. use oil, 47.2 per cent. gas, 25.6 per cent. electricity, and 4.1 per cent. acetylene.

TABLE II.—PASSENGER CAR LIGHTING. TOTAL NUMBER OF CARS AND PERCENTAGES.

	Exclusive		More Than One Method		Total	
	Number	Per Cent.	Number	Per Cent.	Number	Per Cent.
Oil	16,337	29.7	4,249	7.8	20,586	37.5
Gas	20,188	36.7	5,766	10.5	25,954	47.2
Electricity	6,893	12.6	7,194	13.0	14,087	25.6
Acetylene	1,228	2.2	983	1.9	2,211	4.1
Carburetor	1,150	2.1			1,150	2.1
None	69	0.1			69	0.1
Total	45,865		9,096*		54,961*	
Per Cent.		83.4		16.6*		100.0*

*Duplications eliminated.

WATER-PRESSURE WATERPROOFING.

A 40-ft. extension has recently been added to the subway waiting-room of the Erie passenger terminal on the Jersey City water front to take care of passengers on the New York, Susquehanna & Western, which formerly used the Pennsylvania station in Jersey City. The original subway waiting-room, which was connected with the tunnel station of the Hudson & Manhattan by a subway about 770 ft. long, was 30 ft. wide, 176 ft. long and 8 ft. high. It is under and transverse to the tracks and communicates with the train platforms by 10 stairways each between two pairs of tracks. The extension adds two stairways to the number in the original waiting-room.

The proximity of the Hudson river is such as to cause high tides to reach to the top of this waiting-room. In the course of waterproofing the original waiting-room, it was necessary to use two powerful centrifugal pumps, one 8 in. and one 10 in., to keep the excavation free of the water, which entered rapidly through the bottom and sheeting. The Membrane method of waterproofing was used for both the original waiting-room and for the extension. This method consists of five layers of Hydrex waterproofing felt cemented together and coated with hot Hydrex Compound.

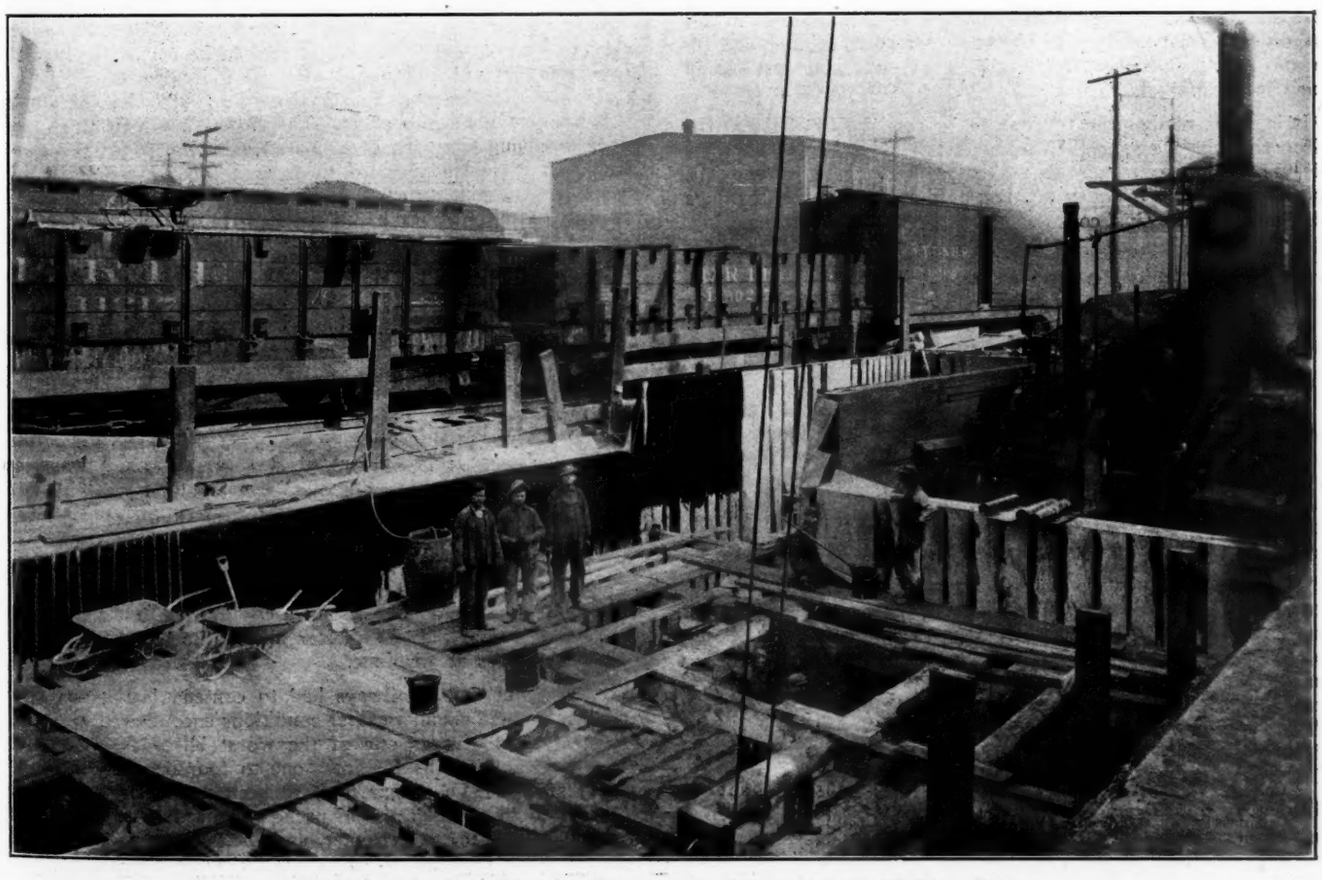
The extension had to be constructed in such a way as not to interfere with the full use of the waiting-room This made it necessary to waterproof and almost complete the extension before tearing out the intervening wall and imposed certain conditions which made it difficult to get the proper connection between the old and the new waterproofing. This, however, was successfully done and the extension was put into use on December 1, 1911, since which date the waterproofing has had to withstand a head of 12 ft. of water.

The waterproofing on the floor and walls of both the extension and the original waiting-room was done by the Hydrex Felt & Engineering Company, New York.

FOREIGN RAILWAY NOTES.

The Congo Railway is to be largely rebuilt, with easier grades and curves and gage widened to 3 ft. 6 in.—the "Cape gage," as it begins to be called. The present railway has answered very well so far, and the company proposes to take 12 years to make these changes.

For some years the project of taking out the rack section of the Central Dominican Railroad between Puerto Plata and Santiago has been agitated. It is now understood that the Dominican government is prepared to undertake this work shortly. A tunnel and various replacements of track will be required. It is expected that reductions of grade at various other points on the line will also be effected. Doing away with the special equipment now required for the rack, together with the other reductions of grade, will markedly reduce the cost of traffic per ton-mile. Such a reduction of freight charges from the great cocao and tobacco districts of the interior to the seaboard will be certain to cause a greater export tonnage to pass through Puerto Plata.



Waterproofing Extension to Erie Station Underground Waiting Room.

General News Section.

The Rock Island Lines have granted an increase in wages to telegraph operators amounting to between 6 and 8 per cent, and the increase was made retroactive to cover the month of February.

The Missouri, Kansas & Texas is organizing safety committees in accordance with the plan which has been adopted by numerous prominent railways as described from time to time in the *Railway Age Gazette*.

The Ontario Parliament has adopted an amendment to the Railway Act under which cities may build street railways where an extension of an existing line is desired and the railway company declines to build it.

The Hoosac tunnel was opened for traffic, both passenger and freight, February 28, on both tracks, but the electric power had not yet been restored in that part of the tunnel which was affected by the fire of February 20.

Two engines and the two foremost cars of the Pennsylvania Special were derailed at Crestline, O., on Monday by the breaking of a wheel on one of the locomotives. No one was injured, and the train was but slightly delayed.

The Boston & Maine has granted trackage rights over its bridge between Portsmouth, N. H., and Kittery, Me., to the Atlantic Shore Railway, an electric company which heretofore has made connection with Portsmouth only by ferry.

A committee of representatives of the Order of Railway Telegraphers and the Brotherhood of Railway Trainmen has been conferring with the management of the Santa Fe at Topeka regarding proposed changes in wage schedules and working conditions.

The plans for the building of new railways in western Canada during the coming summer are so extensive that it is estimated that 50,000 laborers will be wanted, and it is said that the railways and the contractors at present cannot see where these men are coming from.

The Omaha Manufacturers' Association at a recent meeting decided to present to the Union Pacific engrossed resolutions commending the management of the road for patronizing home industry in purchasing a large amount of steel and castings in the Omaha market.

It is reported that the revenue to be received by the state of Minnesota for the year 1911 from its tax on the gross earnings of the railways of the state will show a decrease of $226,331, as compared with 1910, on account of decreases in the earnings of many of the railways.

The Chicago & Eastern Illinois has bought approximately 28,000 acres of coal land in Montgomery county, Ill., from A. R. Bird & Sons, of St. Louis, for $2,500,000. President Winchell has explained that the property was acquired in order to provide a future fuel supply. The five mines on the property will be leased to the present operators for a term of years.

Orders were made effective on March 1 on eleven of the principal railways in Illinois prohibiting the sale of liquors on all of their trains in the state. On July 1, 1911, a new state law went into effect which prohibited the sale of liquors on trains, but its language appeared to exempt buffet and dining cars. On account of a doubt as to this, the railways have decided voluntarily to apply the prohibition to their entire trains.

On the night of February 19, near Altamont, W. Va., the passengers in a sleeping car of a westbound express train of the Baltimore & Ohio were robbed by a masked man, who is said to have boarded the train when it was moving slowly on an ascending grade. He intimidated the trainmen with pistol shots, and secured a considerable sum of money. He jumped off before the train reached Altamont. The next day a police officer of the road arrested F. A. Becker, a freight brakeman of the road, 20 years old, who proved to be the robber.

The Chicago Great Western has issued the first number of a quarterly magazine devoted to the interests of employees and patrons, which is called *The Maize*. The magazine is to be published quarterly. The first number contains articles on "The Telephone as a Business Getter," by J. B. Morrison, assistant to the vice-president; "Railroad Signaling," by Joseph Beaumont, signal engineer; "Backing Up Our Advertising," by F. F. Wagner, advertising agent, and a large variety of short articles and news notes regarding the various activities of the railway.

The Post Office Appropriation bill reported in the Lower House of Congress on Monday of this week, contains a provision for the establishment of a parcels post on all rural mail delivery routes for an experimental period of two years, ending June 30, 1914. The limit of weight prescribed for parcels is eleven pounds, and the rates are graduated from one cent for each two ounces on smaller packages to five cents for a single pound, and two cents a pound additional up to eleven pounds. The bill also provides for the creation of a commission to study the subject of a general parcels post.

The department of industrial research of the University of Pittsburgh, Pittsburgh, Pa., is about to make a study of the smoke problem. This investigation will include the effect of smoke on health, plant life and buildings; also the increased cost of living due to damage and dirt caused by smoke. Each part of the investigation will be carried out by one or more men, each a specialist in his line, and it is hoped that by co-ordinating the various researches it will be possible to obtain valuable technical and scientific data. The investigations are being conducted under the direction of Dr. R. C. Benner and Dr. W. W. Strong.

The Joint Car Exchange Bureau at Denver on March 1 was amplified into a Joint Car Inspection and Interchange Bureau to handle the mechanical as well as the transportation inspection of cars interchanged at that point. William Hansen, who has been a traveling mechanical inspector for the Chicago, Burlington & Quincy, has been appointed manager of the bureau. The executive committee consists of J. A. Turtle, mechanical assistant superintendent of the Union Pacific; H. V. Vanbuskirk, superintendent of motive power of the Colorado & Southern, and W. A. Knerr, local freight agent of the Denver & Rio Grande.

There is a bill before the legislature of New York at Albany to create a state insurance fund for the benefit of employees in hazardous occupations. The bill is said to be of such a radical nature that it will pass only after serious opposition, if at all. It is said to be more drastic than the similar law of Ohio, which has just gone into effect. The New York legislature has also held long discussions of proposed amendments to the constitution of the state designed to provide for the enactment of general laws relating to employers' liability and workmen's compensation. Organizations of artisans and others are promoting the proposed amendments with a view to getting around the objections to the laws on these subjects on which were based the decisions of the Court of Appeals last year holding the laws invalid.

The Supreme Court of Fulton county, N. Y., deciding a suit brought by a shareholder in May, 1909, has ordered the directors of the United States Express Company to call a meeting of stockholders. It is said that there has been no such meeting for fifty years. The control of this company, which formerly was in the hands of Thomas C. Platt, has lately been supposed to be in the hands of interests connected with the estate of the late E. H. Harriman, and not long ago a number of new directors were elected, said to be representatives of the Harriman interests. Now it is said that those minority stockholders who began the proceedings in 1909 have secured the support of a majority of the shares. The company is not a corporation, but a partnership, and it is said that its charter allows the directors to dissolve the business at any time.

The transcontinental railways had to contend last week with some of the most difficult weather conditions encountered in years. In southwestern Kansas one of the worst blizzards on record tied up passenger trains for from one to four days. The Rock Island and Santa Fe appear to have been most affected. Cuts were filled with snow and sand packed so hard as to resist the efforts of the rotary snow plows, and drifts from 15 to 20 feet in height were reported at many places, while the high winds covered the tracks with drifts as fast as they were cleared.

Twenty trains, including three eastbound from the Pacific coast, were reported stalled between Newton and Dodge City, Kan., on February 29, and passengers were sent to hotels at the nearest points that could be reached at the expense of the railways. The trains arriving in Chicago on Friday included the Santa Fe's California Limited, which was due on Monday morning.

An employers' liability bill, carrying out the recommendations of President Taft, has been introduced in both houses of Congress. Hearings were held by the Judiciary Committee of the Senate this week, and thus far it is said that about one-half the sections of the bill have been considered by that committee. Only minor changes have been made. Numerous protests, however, have been received from workingmen's organizations, many of them based, evidently, on misapprehension. It is said that the Louisville & Nashville and the Atchison, Topeka & Santa Fe have expressed objections to the proposed law, though no formal complaint has been presented. President Taft's recommendations for the establishment of a commission on industrial relations have also been embodied in bills introduced in Congress by Senator Borah, of Idaho, and Representative Hughes of New Jersey. The bill, as drawn, provides for a commission of nine men, to serve without compensation, two members to be employers of labor and two representatives of workmen. Provision is made for an exhaustive investigation into every phase of the relations between employers and employees and the effect of industrial conditions on the public welfare.

In the old times before the universal use of air brakes on freight trains it happened now and then that a car in the middle of a freight train would jump the track, fall down a bank, and do so little damage to the track and to the adjacent cars that the trainmen could couple up and go on without discovering what had happened; and there are said to have been one or more cases in which the cars coupled themselves (on a descending grade), making the story still more mysterious. By the use of a little imagination a newspaper reporter has been able to report a case of this kind this present year. It was at Morehouse, Ind., on the Lake Shore & Michigan Southern. As the train was one of 13 cars, with the air connected through to the caboose, the statement as given was unbelievable; and besides, the line was not down grade. It is an interesting story, nevertheless. The train was running about 30 miles an hour, and it appears that the fifth car from the engine was derailed by a fallen brake-beam. The brakes were automatically applied and the engineman, looking back, saw that the train had parted. Observing that the rear part of the train was still moving (the air brakes of two cars at the rear having been cut out) he kept the forward portion moving for about a quarter of a mile; then, seeing that the rear portion had stopped, he backed up, and the train was coupled and went on its way. At the time the engineman looked back the derailed car, which had tumbled into the ditch, was hidden from him by the smoke from his engine. After the train had been coupled the conductor and brakemen noticed the derailed car, but assumed that it had come from some other train. In this situation the whole crew went on to the next station and discovered the loss of the car only when they checked up the numbers after setting out a car of coal.

Traffic on the Burlington.

President Miller is quoted as saying that figures have now been compiled showing the tonnage of the various commodities carried by the Hill roads. The Burlington's tonnage (presumably in 1911) was made up of 18.83 per cent. by agricultural products, 7.93 per cent. by animals and animal products, 38.35 per cent. by mine products, 7.74 per cent. by forest products, 11.39 per cent. by manufactured articles and 15.76 per cent. by all other freight.

Demands of Anthracite Coal Miners.

Representatives of the principal anthracite coal operators met in New York City on Tuesday of this week to consider the demands of the miners who, at the expiration of their present contract on April 1, want an increase in their rate of wages, which is said to amount to 20 per cent. It was decided to reject all of the demands presented, which are embraced in nine sections; and a committee of ten was appointed to draft a formal reply to be presented when the miners are conferred with next week. The railway men included in this committee are E. B. Thomas (Lehigh Valley); W. H. Truesdale (Delaware, Lackawanna & Western); F. D. Underwood (Erie); L. F. Loree (Delaware & Hudson), and George F. Baer (Philadelphia & Reading). Press despatches from the anthracite region report very large supplies of coal on hand at all of the storage centers, but no accurate figures are given.

Proposed National Board of Trade.

A national trade body, apparently something like the merchants' associations of New York and other cities, but with a constituency covering the whole country, is proposed in a call which has been issued by President Taft for a meeting of business men to be held in Washington on April 15. It is proposed at that time to formulate a plan for an organization, and Charles Nagel, Secretary of Commerce and Labor, says that the responses to the President's invitation are already so numerous and hearty as to indicate a successful meeting. The President and Secretary Nagel evidently have in view the establishment of a responsible body, to be organized under a federal charter. The proposed body would have nothing to do with administration, but would be purely commercial. Secretary Nagel has been considering this subject for more than two years and believes that the proposed association will not only be useful but will quickly become popular. Referring to investigations of trade in foreign countries, Mr. Nagel says:

"We are doing something now, but only in a crude way. Merchants and manufacturers write us that they would like certain fields investigated, and we decide it would be a good thing, but we do not know where to turn to get the agents to make the inquiry. We pick out the best men we can find, but how much better it would be if we could turn to members of a central board here in Washington, and they, from their acquaintance and correspondence extending into every line of commerce and industry throughout the country, could suggest the right men.

"Another matter is that of making rules and regulations. Take, for instance, our Lighthouse Board, which recently was called upon to promulgate a new set of regulations. We had repeated conferences with representatives from various commercial interests, and we did the best we could, but we did not have the expert advice from disinterested sources that a national board could have supplied. The administration of the Pure Food law furnishes every week any number of examples where it is absolutely necessary, in fairness to all concerned, that the government should be fully informed upon trade customs and many other details which should have a bearing upon its ruling. The administration of the customs laws demands the most intricate knowledge of trade practices, yet in these and many other cases the government too often has to be dependent upon the testimony of interested parties. . . . It is essential that a body of this kind shall be national in every respect. It would be its duty to take the broad and not the local view of any question of administration."

Restoration of M. C. B. Defect Cards.

A special meeting of the American Association of Railroad Superintendents was held on March 1, at St. Louis, for the purpose of determining a uniform date for beginning the practice of applying M. C. B. defect cards to cars at time of interchange at large interchange centers, in accordance with the rules of the Master Car Builders' Association. Over fifty representatives of the transportation and mechanical departments from various sections were present, and, as a result of the meeting, it was announced that all roads entering Memphis, Kansas City, Pueblo, Denver, Chicago, Cleveland, Toledo, Columbus and the Niagara frontier have adopted or arranged to adopt the carding practice at these points, and it is expected that the practice will be in full force throughout the United States within a short time. During the discussion by members of the association the point was emphasized that the association is obligated to the Master Car Builders' Association's arbitration committee to recall so-called special agreements, in view of the broadening of M. C. B. rule 2, effective September 1, 1911, and that transportation men should do all in their power toward helping the mechanical officers to comply with M. C. B. rules.

It is understood that so far as the American Association of

Railroad Superintendents is concerned, the carding practice may be begun at all points where it is not now in effect on whatever date the mechanical men decide that their inspectors have been properly drilled in the M. C. B. rules, and that the united influence of the superintendents will be extended to accomplish this by April 1. The proceedings of the special meeting will be printed for distribution among all who are interested, and copies may be obtained from E. H. De Groot, Jr., president of the association, at St. Louis.

Station Building in Oklahoma.

Some say straws show which way the wind blows. Be this as it may, a railway executive tells this story about the Oklahoma railway commission: "One of the railways running through Oklahoma, by no means the strongest, contemplated the construction of a shack at cost of about $700, to serve as a passenger station for a small town, but had to get the consent of the commission. It wasn't given. The company showed its lowest-grade station, but the plan was rejected. Successive plans were offered up to one of the highest grades of station constructed by the road in question, and the commission ordered the new station at a cost of $20,000 to serve a population of less than 100. It's needless to say that our railway cannot afford to construct many branch lines or feeders and will build as little as possible in the state."

There's a moral. Look at the following table of mileage in southwestern states:

	Mileage.	Miles of line per 100 sq. mi. of territory.	Miles of line per 10,000 inhabitants.
Arkansas	5,300	10	34.6
Missouri	8,100	11.8	22.5
Kansas	9,000	11	53
Oklahoma	6,000	8	63
Texas	14,000	5.2	38

Wall Street Journal.

English Coal Miners' Strike.

The strike of coal miners in England, covering the whole of that country, was reported on March 4 as having resulted in 1,250,000 miners stopping work, and the resulting interruption of railway traffic and manufacturing was estimated to have made idle 250,000 other persons. On the day mentioned, no coal whatever was brought into the city of London, a thing which had not happened before since 1838. Press despatches said that 2,223 freight and passenger trains had been discontinued, and that many stations had been closed because of the lack of traffic. The price of coal at London advanced two shillings a ton. The demands and threats of the miners have been the subject of discussion in Parliament for some time past, and the Prime Minister described the action of the miners as tending toward a national catastrophe. At the same time the miners looked upon their enforced idleness as a pleasant vacation, and they were spending their time in making trips to the seaside, or going to football matches and other amusements. On Tuesday, the 5th, following many conferences of the mine owners, the representatives of the workmen, and officers of the government, it was said that strong hopes were entertained that some agreement would be reached within a few days. There was slightly increased confidence on the stock exchange on Tuesday, leading railway stock advancing one point. One of the proposals of the government was to enact a law establishing a minimum rate of wages in the coal fields. This course appears to have been approved by a majority of the mine owners, and it was said that this majority was growing, having been augmented by the mine owners of Scotland, leaving only the Welsh owners as the principal objectors. Most of the railways are said to be well stocked with coal, but train service was severely curtailed in order to be prepared as well as possible for all emergencies. Numerous important sailings of steamships had to be abandoned or postponed because of difficulty in getting coal.

Proposed Harbor Development at Chicago.

The United States War department on Monday issued a permit for the construction by the city of Chicago of piers for the proposed outer harbor north of the mouth of the Chicago river in accordance with plans adopted by the city council, for which a bond issue of $5,000,000 will be voted on at the city election in April. Lieut.-Col. George A. Zinn, of the board of army engineers on rivers and harbors, has made a report to the department which fails to recommend the construction of the outer harbor, but favors the construction of a commercial harbor at some point on the shore of Lake Michigan in the vicinity of Gary or Indiana Harbor, a commercial harbor on the drainage canal in the vicinity of Summit, Ill., the construction of municipal docks at suitable intervals along the Chicago and Calumet rivers, and other smaller improvements, but finds that no other improvements in the waterways at Chicago or adjacent territory other than those specifically mentioned are either necessary or desirable at the present time.

A part of the plan contemplates the construction of a breakwater by the United States government near the mouth of the river at a cost of $2,500,000, which will be considered at a hearing before the Board of Engineers on March 27. Lieut.-Col. Zinn reported adversely to this project on the ground of lack of connecting railway facilities and said that the proposed harbor could not be properly developed unless the railways adopt a plan for a belt line completely encircling the city in accordance with a plan such as that outlined recently before the Traffic Club of Chicago by L. C. Fritch, chief engineer of the Chicago Great Western.

Darius Miller Urges Co-Operation of Governors to Reduce Trespassing.

President Darius Miller of the Chicago, Burlington & Quincy, has written a letter to the governors of Illinois, Iowa, Colorado, New Mexico, Kansas, Minnesota, Missouri, Montana, Nebraska, South Dakota, Texas, Wisconsin and Wyoming, the thirteen states through which the Burlington lines run, calling attention to the large proportion of trespassers in the number of persons killed on the railways of the United States, and asking their consideration of the seriousness of the subject. Mr. Miller points out that the interest of public authorities and railway casualties has been concentrated almost entirely on the classes of accidents which cause a smaller percentage of fatalities, and urges their support toward correcting the conditions which make trespassing possible. Mr. Miller's letter is as follows:

"Certain phases of the subject of railway accidents are being given attention by the officials of the state and national governments who are concerned with the regulation of railways. I am writing this letter to call the attention of yourself and others occupying public offices of responsibility and influence to the fact that the most serious phase of this subject seems to be receiving almost no consideration from either the public or public officials.

"The statistics of the Interstate Commerce Commission show that no less than 51,083 people were killed while trespassing on the property of the railways of this country during the ten years 1902-1911.

"Because of the fact that there recently have been some accidents due to breakage of rails which have been given widespread publicity, it is reported that certain of the regulating authorities are considering taking some action in reference to the rail situation. The statistics of the Interstate Commerce Commission show that during the last ten years 106 persons have been killed in derailments caused by rail breakages. This is an average *of less than 11 a year.* The average number of persons killed while trespassing on railway property has been during the same period *over 14 per day.* In other words, while people have been killed at the rate of only 106 in *10 years* by rail breakages, they have been killed at the rate of over 140 every *ten days* while trespassing.

"Three measures have been introduced in Congress to require the railways to install block signals, to substitute steel for wooden passenger train cars, and to widen their clearances. It is estimated that compliance with this proposed legislation would cost the roads $1,361,000,000, which is almost 10 per cent. of their present total net capitalization. The object sought is to protect passengers and employees. The number of railway passengers killed during the last ten years was 4,340. There was not a *single year* of the ten years when the number of trespassers killed did not exceed the total number of passengers killed in all of the ten years. Furthermore, the number of employees killed during this period is only two-thirds as great as the number of trespassers. Indeed, the number of trespassers killed has

considerably exceeded the total number of all other classes of persons, including employees, passengers, those meeting death at highway crossings, etc. If a wreck should take place tomorrow, in which 14 people should die, the news of it would be widely printed over the country. Now, if the average for the last ten years is holding good, 14 people were killed yesterday while trespassing on the railways, whose deaths were wholly unnecessary, and under proper laws might have been avoided. Fourteen were killed today; and 14 will be killed tomorrow; and yet, chiefly because these 14 people who are killed daily meet their deaths in 14 different places, almost no public notice is taken nor concern manifested. The railways are constantly making efforts to keep the public from trespassing upon rights of way where danger of death and injury is always present, but without public support through passage of adequate laws and firm enforcement of them, these terrible statistics show how futile the efforts of the railways are.

"Lawmakers and commissions are justified in imposing on the railways reasonable regulations to promote public safety. But does it not seem that one of the most important and necessary means of safety lies in the regulation of the public in this indiscriminate use of railway premises, and that for this purpose public authorities should give attention to and take action regarding the main cause of fatal accidents on railways? This main cause, as the figures I have given show, is that people persist, as the Interstate Commerce Commission says in its latest accident bulletin, in 'trespassing on the property of the railways, principally while walking on the tracks or stealing rides on trains" and they persist in doing so, because proper laws to prevent this sort of intrusion on railway property are not passed, and courts and police officers do not enforce such laws where they exist.

"Trespassing on railway property, which is almost universal in the United States, is a cause of great trouble and expense to the railways. It is constantly necessary for trainmen to stop trains to put off people who are stealing rides or to keep from running down those who are walking on the tracks. Oftentimes, trainmen become involved in fights with trespassers and are injured or killed by them. The tramps who infest railway tracks, yards, cars, and rights of way start fires which destroy property of great aggregate value and commit depredations upon railway property and that of the public entrusted to carriers for transportation. Trespassers often meddle with switches or signal lights or put obstructions on the track in such a way as to cause serious train accidents. For these reasons the railways and their patrons are entitled to have laws passed and enforced which will stop this almost universal practice. Finally, trespassing ought to be abolished for the protection of those who participate in it. If it is worth while for the railways to spend millions of dollars for block signals to stop collisions when the total number of persons annually killed in collisions is only about 400, is it not worth while for the governments to take some action to stop the evil of trespassing which costs an average of over 5,000 lives annually?

"All that is necessary to stop it is to recognize the fact that the property of railways, excepting places provided for public use, can never be otherwise than a place of danger for those who have no business on it and to pass and enforce laws for the punishment of those who intrude upon it. This is done in foreign countries, and is one of the main reasons why the number of fatalities on foreign railways is less in proportion than on the railways of the United States. Representatives of the railways repeatedly have appeared before legislatures to ask appropriate legislation dealing with this subject, and innumerable times they have had trespassers arrested. But little progress seems to have been made in securing the passage and enforcement of proper laws. The fact has been widely published over the country that in the year ending June 30, 1911, 10,396 people were killed on the railways of the United States. How many people know that if no trespassers had been killed the number would have been only 5,112—in other words, that of those killed 5,284, or 51 per cent., belonged to this class?

"Under these circumstances, it would therefore seem entirely proper that serious consideration should be given to this subject by every public officer in whom is reposed any duty or responsibility relating to the regulation of our railways, and I feel justified in asking that you give this important subject your earnest consideration and support so that something can be done to correct these conditions."

Program of the American Railway Engineering Convention.

The program for the thirteenth annual convention of the American Railway Engineering Association, to be held in Chicago, March 19-21, inclusive, has been announced as follows. The order may be changed by a two-thirds vote of the convention or by the time required for consideration of reports.

Morning sessions—9 a. m. to 12:30 p. m.
Afternoon sessions—2 p. m. to 5:30 p. m.

TUESDAY, MARCH 19.

President's address.
Reports of secretary and treasurer.
Reports of standing and special committees.
XII. Rules and Organization—Bulletin 141.
X. Signals and Interlocking—Bulletin 141.
Minority Report on Signals and Interlocking—Bulletin 141.
XV. Iron and Steel Structures—Bulletin 141.
VII. Wooden Bridges and Trestles—Bulletin 141.
XIV. Yards and Terminals—Bulletin 141.
II. Ballast—Bulletin 141.
III. Ties—Bulletin 142.
Adjournment at 4 p. m. to visit Railway Appliances Exhibition in the Coliseum.

WEDNESDAY, MARCH 20.

V. Track—Bulletin 142.
I. Roadway—Bulletin 142.
IV. Rail—Bulletins 143 and 144.
XIII. Water Service—Bulletin 142.
VIII. Masonry—Bulletin 143.
XIX. Conservation of Natural Resources—Bulletin 143.
XI. Records and Accounts—Bulletin 143.
XVIII. Electricity—Bulletin 143.
Annual dinner at 7 p. m.

THURSDAY, MARCH 21.

XVI. Economics of Railway Location—Bulletin 144.
IX. Signs, Fences and Crossings—Bulletin 143.
VI. Buildings—Bulletin 144.
Special. Grading of Lumber—Bulletins 133 and 144.
XVII. Wood Preservation—Bulletin 144.
Special. Uniform General Contract Forms—Bulletin 145.
New business.
Election and installation of officers.
Adjournment.

Railway Signal Association.

The regular meeting of the Railway Signal Association will be held at Congress Hotel, Chicago, on Monday, the 18th, the morning session beginning at 9:30 o'clock. Reports will be presented by sub-committee E, of committee No. 3, on power interlocking; by sub-committee No. 1, of committee No. 4, dealing with revisions of the specifications for relays; by committee No. 4 on automatic block signaling, dealing with specifications for steel cross-arm pins; by sub-committee No. 4, of committee No. 4, dealing with specifications for channel pins; by committee No. 6 presenting drawings for proposed standard rocker shaft arms, bearings and details, detector bars, and a terminal block; by sub-committee C, of committee No. 8, presenting a proposed code of requisites of apparatus and material for an alternating-current automatic block signal system; by committee No. 9, dealing with specifications for copper clad line wire, armored submarine cable and copper clad bond wires; by the special committee on storage batteries, and by the special committee on contracts.

In connection with the notice of the March meeting, Secretary C. C. Rosenberg announces the result of the letter ballots which were ordered at the annual convention held at Colorado Springs last October. The total number of ballots received was 598; from active members, 191, and from representative members, 407. The subjects voted on were a scheme for uniform signaling; a large number of standard designs for material; 12 pages of symbols to be used in drawings; specifications for signal pipe and concrete and for locking draw-bridges; typical plans for electric interlocking;

typical circuit plans and designs for trunking, etc.; specifications for electro-pneumatic interlocking; for wires and cables; for apparatus and materials for use in automatic signaling; for storage batteries and for many other things. All of the propositions received the required two-thirds affrmative vote with the exception of the recommendations of committee No. 1 for a uniform method of signaling. On this subject, concerning which the committee had presented eight conclusions, the votes were as follows: conclusion No. 1, 296 affirmative, 276 negative and 26 not voting; conclusion No. 2, 344 to 230; No. 3, 332 to 243; No. 4, 341 to 233; No. 5, 285 to 287; No. 6, 336 to 235; No. 7, 345 to 226, and the resolution (page 536 of the December *Journal*), 291 to 223. It will be seen that there was a majority of affirmative votes on each conclusion except No. 5.

Spokane Transportation Club.

The third anniversary of the Spokane Transportation Club was celebrated by a banquet and business meeting at the Spokane hotel, Spokane, Wash., on February 23. The following members were elected to the executive committee for the ensuing year: Charles W. Colby, United Iron Works, Oakland, Cal.; H. C. Munson (O.-W. R. & N.); Stephen H. Brown (G. N.); R. A. Willson, Washington Water Power Co., Spokane, and C. L. Bankson (S. & I. E.). At the meeting of the executive committee, held February 26, the following officers were elected: Charles W. Colby, president; R. A. Willson, vice-president; H. C. Munson, second vice-president. J. W. MacIntosh was secretary and treasurer last year; the new secretary and treasurer has not yet been elected.

American Society of Mechanical Engineers.

At the meeting of the American Society of Mechanical Engineers, to be held March 12, a paper will be presented on Practical Problems in Tap and Screw Making, by Frank O. Wells, president and treasurer of the Wells Brothers Company, Greenfield, Mass., dealing with the importance of size and lead in the cost of assembling manufactured work, the practical limits of accuracy, reasons for abandoning the V-thread, the proper size of tap drills, the power required for tapping, the effect of lubricants on size and power, and other interesting points. A number of prominent tap makers have been invited to discuss the subject.

Chicago Transportation Association.

At the meeting of the Chicago Transportation Association on March 4, 360 new members were enrolled, bringing the total up to 1,175. On May 1, 1911, the membership was 160.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass.; annual, May 7-10, Richmond, Va.

American Association of Demurrage Officers.—A. G. Thomason, Boston, Mass.; annual, May 10-11, San Francisco, Cal.

American Association of General Passenger and Ticket Agents.—W. C. Hope, New York; next convention, Seattle, Wash.

American Association of Freight Agents.—R. O. Wells, East St. Louis, Ill.; annual, June 18-21, Detroit, Mich.

American Association of Railroad Superintendents.—O. G. Fetter, Carew building, Cincinnati, Ohio; 3d Friday of March and September; annual, March 17, Chicago.

American Electric Railway Association—H. C. Donecker, 29 W. 39th St., New York. Convention, October 7-11, Chicago.

American Electrical Railway Manufacturers' Assoc.—George Keegan, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.

American Railway Association.—W. F. Allen, 75 Church St., New York. Next session, May 15, New York.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W., Chicago. Convention, 3d week in Oct., Baltimore, Md.

American Railway Engineering Association.—E. H. Fritch, Monadnock Block, Chicago; annual convention, March 19-21, 1912, Chicago.

American Railway Master Mechanics' Assoc.—J. W. Taylor, Old Colony building, Chicago. Convention, June 17-19, Atlantic City, N. J.

American Railway Tool Foremen's Association.—M. H. Bray, N. Y. N. H. & H., New Haven, Conn. Convention, July 9, Chicago.

American Society for Testing Materials.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa. Annual, March 28-29, New York.

American Society of Civil Engineers.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.

American Society of Engineering Contractors.—J. R. Wemlinger, 13 Park Row, New York; 2d Tuesday of each month, New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York.

American Wood Preservers' Association.—F. J. Angier, B. & O., Baltimore, Md. Convention, 3d week in January, 1913, Chicago.

Association of American Railway Accounting Officers.—C. G. Phillips, 143 Dearborn St., Chicago; annual, June 26, 1912, Quebec, Que.

Association of Railway Claim Agents.—J. R. McSherry, C. & E. I., Chicago; annual convention, May 22, 1912, Los Angeles, Cal.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago.

Association of Railway Telegraph Superintendents.—P. W. Drew, 135 Adams St., Chicago; annual, June 24, 1912, New York.

Association of Transportation and Car Accounting Officers.—G. P. Conrad, 75 Church St., New York. Convention, Oct. 7-11, Chicago.

Canadian Railway Club.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and Aug., Montreal.

Canadian Society of Civil Engineers.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.

Civil Engineers' Society of St. Paul.—L. S. Pomeroy, Old State Capitol building, St. Paul, Minn.; 2d Monday, except June, July, August and September, St. Paul.

Engineers' Society of Pennsylvania.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.

Engineers' Society of Western Pennsylvania.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

Freight Claim Association.—Warren P. Taylor, Richmond, Va.; annual, May 15, Buffalo, N. Y.

General Superintendents' Association of Chicago.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

International Railway Congress.—Executive Committee, rue de Louvain, 11 Brussels; 1915, Berlin.

International Railway Fuel Association.—D. B. Sebastian, La Salle St. Station, Chicago. Convention, May 22-25, Chicago.

International Railway General Foremen's Association.—L. H. Bryan, Brown Marx building, Birmingham, Ala. Convention, July 23-26, Chicago.

International Railroad Master Blacksmiths' Association.—A. L. Woodworth, Lima, Ohio. Convention, August 15, Chicago.

Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York; annual convention, May 14-17, Pittsburgh, Pa.

Master Car Builders' Association.—J. W. Taylor, Old Colony building, Chicago. Annual convention, June 12-14, Atlantic City, N. J.

Master Car and Locomotive Painters' Assoc. of U. S. and Canada.—A. P. Dane, B. & M., Reading, Mass. Convention, September 10-13, Denver, Col.

National Railway Appliances Assoc.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meetings with Am. Ry. Eng. Assoc.

New England Railroad Club.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

New York Railroad Club.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

Northern Railroad Club.—C. L. Kennedy, C. M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.

Omaha Railway Club.—H. H. Maulick, Barker Block, Omaha, Neb.; second Wednesday.

Railroad Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

Railway Business Association.—Frank W. Noxon, 2 Rector St., New York.

Railway Club of Pittsburgh.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

Railway Electrical Supply Manufacturers' Assoc.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.

Railway Gardening Association.—J. S. Butterfield, Lee's Summit, Mo.; next meeting, August 13-16, Roanoke, Va.

Railway Industrial Association.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; annual, May 12, 1912, Kansas City, Mo.

Railway Signal Association.—C. C. Rosenberg, Bethlehem, Pa. Next meeting, March 18, Chicago.

Railway Storekeepers' Association.—J. P. Murphy, Box C, Collinwood, Ohio. Convention, May 20-22, Buffalo, N. Y.

Railway Supply Manufacturers' Assoc.—J. D. Conway, 2135 Oliver Bldg., Pittsburgh, Pa. Meetings with M. M. and M. C. B. assocs.

Railway Tel. & Tel. Appliance Assoc.—W. E. Harkness, 284 Pearl St., New York. Meetings with Assoc. of Ry. Teleg. Sups.

Richmond Railroad Club.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.

Roadmasters' and Maintenance of Way Association.—L. C. Ryan, C. & N. Y., Sterling; September, 1912, Buffalo, N. Y.

St. Louis Railway Club.—B. W. Fraumenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

Signal Appliance Association.—F. W. Edmonds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.

Society of Railway Financial Officers.—C. Nyquist, La Salle St. Station, Chicago.

Southern Association of Car Service Officers.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.

Southern & Southwestern Railway Club.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.

Toledo Transportation Club.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

Traffic Club of Chicago.—Guy S. McCabe, La Salle Hotel, Chicago; meetings monthly, Chicago.

Traffic Club of New York.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.

Traffic Club of Pittsburgh.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

Train Despatchers' Association of America.—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 18, 1912, Louisville, Ky.

Transportation Club of Buffalo.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

Transportation Club of Detroit.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

Traveling Engineers' Association.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.; August, 1912.

Western Canada Railway Club.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

Western Railway Club.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.

Western Society of Engineers.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Monday in month, except July and August, Chicago.

Traffic News.

A serious shortage of cars for the movement of grain eastward is reported from Duluth, Minn., and Superior, Wis.

President Taft will be the guest of the Traffic Club of Chicago at an entertainment on Saturday evening, March 9, in the banquet hall of the Hotel LaSalle.

A bill which is now before the New York legislature at Albany provides for the creation of a commission to examine traffic conditions on the Great Lakes and on the canals and water courses of New York.

In the United States District Court at Philadelphia, W. J. Jacoby & Sons, coal shippers, have sued the Pennsylvania Railroad for $51,950 damages for alleged illegal discrimination in the distribution of coal cars to the mines between April, 1903, and October, 1905.

On March 1 the agencies of the Lake Shore-Lehigh Valley and Michigan Central-Lehigh Valley fast freight lines, at Cleveland, Cincinnati, Toledo, Indianapolis, St. Louis and Milwaukee, were discontinued, and hereafter the solicitation of traffic for these lines will be done by the representatives of the individual railways.

The Philadelphia & Reading has introduced ten-trip tickets between Camden, N. J., and suburban points in New Jersey, the rates in many cases being the same as those heretofore in effect for 100-trip tickets. New forms of round-trip tickets have been introduced on the Lebanon division. For many journeys there are now available both six-day and ten-day round-trip tickets, the six-day being slightly cheaper.

The Union Pacific and Chicago, Milwaukee & St. Paul have made a traffic agreement whereby trains will run solid from Chicago to the Pacific coast, an agreement for years held exclusively by the Chicago & North Western and Union Pacific. Westbound trains will be split into three sections at Green River for Portland, San Francisco and Los Angeles. Eastbound, three sections arriving at Green River will run as one solid train to Chicago.

The Grand Trunk, in connection with the Central Vermont, proposes to run a through night passenger train the coming summer between Montreal and New London, running through in twelve hours each way (376 miles). It is announced that this train is to be put on for the benefit of Canadians with a view of inducing them to include New London and its vicinity among their summer resorts. The schedule announced will require somewhat faster time than is made by the night trains now running from Montreal to Boston and Springfield.

The College of Agriculture of the Ohio State University is preparing to run a special instruction train over the lines of the Baltimore & Ohio in that state March 26, 27, 28, 29 and 30. Instruction will be given in corn culture and fruit raising. The Department of Agricultural Extension, of this college, of which Prof. A. B. Graham is superintendent, has been one of the most active instrumentalities in the conduct of "traveling lectures," having run 14 such excursions during the year 1911, covering 3,379 miles. Stops were made at 360 places, and the people who listened to the lectures numbered 42,198.

The proposed law to regulate the issuance of bills of lading was the subject of a hearing before the Senate Committee at Washington last week. Mr. Thom, general counsel of the Southern Railway, describing the conditions which have prevailed during the past few years, and criticizing the proposed law, said that the liability of the railways for bills of lading made out between the agents and shippers, with all the opportunity for collusion between these two individually, would place the railways in the position of being not only carriers, but bankers. He said that the Southern Railway system had from 1,500 to 2,000 agents of varying ability, intelligence, and character. Through the Southeastern territory, east of the Mississippi and south of the Potomac, the railways were already co-operating, and had established a central bureau at New York, to which the roads forwarded copies of all lading bills. He said the complaints came from the banks, which felt that a New York bureau concentrated business at New York to the detriment of other ports. The railways wanted to co-operate to the fullest extent, but they should not be held liable.

INTERSTATE COMMERCE COMMISSION.

The Oklahoma Traffic Association has filed complaints with the Interstate Commerce Commission alleging excessive and discriminatory rates on iron and steel articles from eastern points to Oklahoma.

The commission on March 4 vacated its order of February 23 suspending an advance in freight rates over the Boston & Maine, the Boston & Albany and the New York Central from Chicopee, Mass., and other points, to New York City.

John Marble, who was appointed secretary of the Interstate Commerce Commission not long after Mr. Moseley's death, as was announced in the *Railway Age Gazette* at the time, took the oath of office on February 23 and immediately took up his duties. The official announcement has been delayed since the appointment because of other work that Mr. Marble was doing. On February 5 the commission created the office of assistant secretary and elected G. B. McGinty, heretofore private secretary to Commissioner Clements (last year chairman) to that office.

Special Examiner Gerry began a hearing at New Orleans on February 29 on the complaint of the New Orleans Cotton Exchange, asking a readjustment of the rates on cotton from Texas points to New Orleans in order to establish a parity of rates to New Orleans and Galveston. Witnesses representing the New Orleans cotton interests objected to the differential of ten cents in the Galveston rates under those to New Orleans, rather than to the New Orleans rates themselves, and it was brought out that the Galveston rates were controlled mainly by the Texas Railway Commission.

Testifying at the hearing of the express investigation before the commission last week, W. A. Worthington, representing the Union Pacific and Southern Pacific, said that the express traffic did not pay its fair share of the cost of railway operation; no other class of traffic is so unremunerative. James Peabody, speaking for the Atchison, Topeka & Santa Fe, said that in January, 1910, the road actually lost money on its express business—$17,406. His calculations were based on receipts per car-foot mile, taking into account the proper proportion of expenses, taxes and interest. Where the passenger service yielded a surplus of $80,740, the mail business showed a loss of $28,064, and the express business a loss of $17,406.

Rates on Salt Not Reduced.

Board of Railway Commissioners of Kansas v. Atchison, Topeka & Santa Fe. Opinion by Commissioner Prouty.

The commission finds that the present rates on salt from Kansas fields to points east of the Mississippi and Missouri are not unreasonable, either *per se* or as compared with rates from the Michigan field. An application for relief under the fourth section in regard to the salt rates, however, will be taken up later. (22 I. C. C., 407.)

An Exception to the Fourth Section Permitted.

Bluefield Shippers' Association v. Norfolk & Western et al. Opinion by Commissioner Prouty:

The complaint is in regard to rates both from the East and from the West to Bluefield, W. Va. The rates from New York, Philadelphia, etc., are claimed to be unreasonable *per se*, and the rates from Cincinnati, Columbus, Chicago and Pittsburgh are claimed to be in violation of the fourth section. The commission finds that the present class rates and rates on grain from Cincinnati and Columbus to Bluefield, and the class rates from Pittsburgh to Bluefield, are unreasonable and lower rates are ordered. The rates on iron articles from Pittsburgh to Bluefield via Columbus are not found to be unreasonable. Class rates from New York, Philadelphia and Baltimore to Bluefield are found to be unreasonable and lower rates are ordered. The commission finds that there are competitive conditions at Roanoke, Va., which are beyond the control of the Norfolk & Western and which compel the maintenance of rates at that point now in effect from Cincinnati, Columbus, Chicago and Pittsburgh. The charging of higher rates at intermediate points than to Roanoke and points east from Pittsburgh, etc., should be permitted so long as the present rates from these points to Roanoke and beyond do not exceed those now in effect; also, so long as no higher rates are charged at Bluefield than have been found reasonable from Pittsburgh, etc. (22 I. C. C., 519.)

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF JANUARY, 1912.

Name of road.	Mileage operated at end of period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total, inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	General.	Total.					
Alabama & Vicksburg	142	$97,865	$38,241	$146,296	$21,480	$30,752	$3,605	$55,419	$4,998	$116,234	$30,062	—$1,299	$4,600	$24,163	—$10,692
Alabama Great Southern	309	270,715	84,910	385,952	49,508	87,818	12,801	124,759	10,239	285,125	100,827	—619	15,285	84,923	—11,110
Atchison, Topeka & Santa Fe	7,977[1]	4,344,368	1,947,869	6,852,459	1,013,435	1,203,743	193,102	2,378,493	161,685	4,950,458	1,902,001	.....	293,596	1,608,405	—292,424
Atlanta, Birmingham & Atlantic	661	201,045	47,789	266,084	29,194	49,983	16,968	119,287	13,704	229,136	36,948	.....	15,700	21,248	—25,108
Atlantic & St. Lawrence	166[2]	109,500	17,645	139,145	12,847	19,686	4,865	85,443	4,104	126,945	12,200	.....	6,658	5,542	—12,586
Atlantic Coast Line	4,526	1,781,237	754,230	2,737,997	386,769	405,676	57,045	1,041,087	73,875	1,964,452	773,545	.....	107,000	666,545	—145,583
Baltimore & Ohio Chicago Terminal	77	.....	1,901	110,121	8,115	18,302	767	62,359	3,860	93,403	16,718	$774	18,206	—714	16,653
Bangor & Aroostook	627	228,792	39,372	283,135	41,430	31,867	4,507	100,998	10,381	189,183	93,952	.....	10,375	83,577	—6,037
Bessemer & Lake Erie	203[3]	261,479	20,220	290,107	41,718	127,422	7,864	134,961	9,902	321,867	—31,760	.....	9,000	—40,760	—28,840
Boston & Maine	2,344[3*]	2,013,400	1,029,134	3,297,745	319,017	546,465	30,317	1,709,258	84,848	2,689,905	607,840	4,337	175,186	436,991	—60,819
Butte, Anaconda & Pacific	46	88,362	6,024	100,941	7,595	16,894	708	49,263	2,468	76,928	24,013	.....	2,000	22,013	14,868
Canadian Pacific Lines in Maine	233	107,067	26,732	140,123	19,246	26,628	4,719	62,638	6,732	119,963	20,160	.....	7,000	13,160	6,685
Carolina, Clinchfield & Ohio	238[4]	167,109	10,343	181,172	10,975	20,928	5,770	37,407	7,874	82,954	98,218	.....	8,000	90,218	17,878
Carolina, Clinchfield & Ohio of S. C.	17	9,619	1,556	11,535	704	119	980	2,812	673	5,288	6,247	.....	500	5,747	—1,110
Central of Georgia	1,915	713,025	284,639	1,112,005	164,007	221,784	33,918	459,499	36,965	916,173	195,832	4,580	50,893	149,519	—129,210
Central New England	276	237,085	22,257	275,205	38,468	21,988	1,118	84,919	3,448	149,941	125,264	—2,721	9,000	113,543	40,177
Charleston & Western Carolina	340	106,420	29,104	144,427	30,845	23,843	3,020	70,988	4,615	133,311	11,116	.....	5,000	6,116	—40,604
Chicago & Alton	1,025	692,388	287,064	1,065,366	107,968	274,128	38,257	484,908	33,624	938,885	126,481	—4,465	36,000	86,016	—119,926
Chicago & Northwestern	7,928[5]	2,971,494	1,366,171	4,903,210	590,031	880,190	114,711	2,800,690	126,810	4,512,432	390,778	—16,067	275,000	99,711	—821,438
Chicago, Burlington & Quincy	9,074[6]	4,346,249	1,499,741	6,509,074	481,298	1,315,027	114,440	2,487,810	191,539	4,590,114	1,918,960	—11,699	264,413	1,642,848	—102,598
Chicago & Eastern Illinois	1,275	890,841	234,963	1,226,227	112,258	274,113	28,015	545,418	44,112	1,003,916	222,311	2,931	37,500	187,742	—129,140
Chicago, Indiana & Southern	358	296,727	21,234	328,184	45,931	105,422	7,518	139,346	8,422	306,639	21,545	—94	13,000	8,451	—10,118
Chicago, Milwaukee & Puget Sound	2,058[7]	739,436	139,662	931,238	118,636	164,982	29,561	467,894	24,405	805,478	125,760	—1,231	137,049	—12,520	—159,189
Chicago, Milwaukee & St. Paul	7,511	2,820,615	892,377	4,256,349	361,238	827,624	100,423	2,350,502	98,477	3,738,264	518,085	—17,825	250,694	249,566	—83,256
Chicago, Peoria & St. Louis	255	108,227	20,558	138,162	20,129	28,140	7,816	69,895	6,385	132,365	5,797	.....	4,300	1,497	13,107
Chicago, Rock Island & Pacific	7,551[8]	2,864,803	1,269,816	4,463,610	518,584	682,095	159,920	2,214,390	178,612	3,753,601	710,009	—17,987	225,123	466,899	—507,234
Chicago, St. Paul, Minneapolis & Omaha	1,743	674,342	343,746	1,099,350	74,274	150,126	24,052	598,381	33,519	880,352	218,998	—3,000	63,928	154,770	—140,982
Cincinnati, Hamilton & Dayton	1,014	539,749	108,001	720,428	73,302	144,285	20,018	339,926	18,751	596,282	124,146	.....	24,689	99,457	26,681
Cincinnati, New Orleans & Texas Pacific	337	583,028	158,548	779,627	80,792	190,154	20,902	250,425	19,620	561,893	217,734	415	21,800	196,349	—39,870
Cincinnati Northern	244	74,134	14,003	92,215	17,183	24,763	2,452	48,011	3,686	96,095	—3,880	.....	5,300	—9,180	—14,540
Cleveland, Cincinnati, Chic. & St. Louis	2,011	1,515,172	528,628	2,244,664	271,996	450,680	70,176	1,159,586	51,882	2,004,320	*240,344	—8,153	95,000	137,191	—103,478
Colorado & Southern	1,052[9]	554,502	82,310	688,890	70,115	137,873	12,188	251,862	21,357	493,395	195,495	—1,838	29,200	164,457	—68,256
Cumberland Valley	162	172,718	47,555	231,480	41,874	36,335	4,761	87,699	7,362	178,031	53,449	316	5,612	48,153	—32,731
Delaware, Lackawanna & Western	958[10]	2,096,840	532,416	2,822,894	221,913	501,705	73,067	992,622	66,586	1,855,893	967,001	10,889	168,940	808,950	—256,565
Denver & Rio Grande	2,544	1,312,912	282,950	1,678,558	145,714	367,739	51,674	697,992	57,354	1,320,473	358,085	—8,503	78,000	271,582	—55,775
Denver, Northwestern & Pacific	214	93,387	9,641	107,531	13,907	20,726	2,333	48,646	3,423	89,035	18,496	.....	4,500	13,996	—14,942
Detroit & Mackinac	358[11]	56,179	22,539	84,701	19,051	20,067	2,965	37,248	3,721	83,052	1,649	129	8,249	—6,471	—25,398
Detroit, Grand Haven & Milwaukee	190	107,000	34,600	162,597	15,580	27,850	6,214	117,323	4,812	171,779	—9,182	—63	2,880	—12,125	—20,949
Duluth & Iron Range	200[12]	76,984	19,408	107,301	31,948	44,250	829	79,731	10,361	167,119	—59,818	—2,903	4,494	—67,215	—8,999
Duluth, Missabe & Northern	341[13]	72,523	30,882	108,742	40,939	47,977	1,568	64,124	11,194	165,802	—57,060	101	4,256	—61,215	—54,406
Elgin, Joliet & Eastern	841	719,463	3	761,771	74,164	149,831	4,067	267,692	14,494	510,248	251,523	.....	18,125	233,398	120,175
Florida East Coast	629	178,062	183,822	423,304	58,624	50,513	12,300	203,829	10,943	336,209	87,095	.....	15,500	71,595	—49,684
Fort Worth & Denver City	454	268,649	103,633	394,618	44,113	78,414	5,972	156,817	15,247	300,563	94,055	—209	10,292	83,554	—51,813
Galveston, Harrisburg & San Antonio	1,338	553,549	232,676	834,345	125,309	191,708	34,098	379,417	29,334	759,866	74,479	—6,628	16,508	51,343	—106,555
Grand Rapids & Indiana	586[14]	224,645	104,351	358,949	52,777	72,477	11,427	194,654	14,826	346,161	12,788	—249	23,226	—10,687	—37,075
Grand Trunk Western	347	345,000	144,100	519,116	33,905	92,263	17,855	248,901	14,215	407,139	111,977	—2,002	31,635	78,340	—29,057
Great Northern	7,344[15]	2,624,783	820,833	3,806,389	389,305	677,716	88,145	1,572,192	106,345	2,833,703	972,686	—11,572	243,013	718,101	458,925
Gulf & Ship Island	307	131,586	30,712	177,833	19,605	29,334	2,754	54,103	8,955	114,751	63,082	.....	4,457	58,625	—1,567
Gulf, Colorado & Santa Fe	1,597[16]	710,128	201,188	982,332	133,602	159,342	26,207	433,111	38,995	791,257	191,075	.....	42,929	148,146	107,289
Houston, East & West Texas	190	69,739	20,907	96,035	23,631	12,843	1,885	38,618	3,536	80,513	16,122	.....	3,916	12,206	—24,808
Houston & Texas Central	789	252,521	109,767	403,804	32,068	92,727	16,322	220,970	22,297	434,384	—30,580	—1,690	20,558	—52,828	—91,212
Illinois Central	4,755[17]	2,633,052	1,027,312	4,198,218	523,398	1,328,026	104,758	2,157,267	120,535	4,233,984	—35,766	64	230,955	—266,657	—1,743,797
Indiana Harbor Belt	104[18]	.....	.....	197,412	23,501	22,980	3,029	102,686	7,839	160,035	37,377	543	5,000	32,920	21,855
Kansas City Southern	827	501,988	118,318	697,848	81,192	118,250	28,411	291,788	30,491	550,132	147,716	.....	30,924	116,792	—114,956
Lake Erie & Western	886	339,451	60,632	425,765	62,005	83,324	12,119	205,615	11,717	374,780	50,985	.....	19,000	31,985	—23,790
Lake Shore & Michigan Southern	1,775[19]	2,508,040	886,374	3,847,877	423,965	699,978	78,867	1,524,055	75,688	2,802,553	1,045,324	—7,592	140,000	897,732	236,982

Operated in the previous year—[1] 7,526; [2] 4,494; [3] 204; [3*] 2,242; [4] 236; [5] 7,743; [6] 9,091; [7] 1,997; [8] 7,548; [9] 1,180; [10] 930; [11] 360; [12] 190; [13] 316; [14] 587; [15] 7,274; [16] 1,518; [17] 4,575; [18] 113; [19] 1,662.
— Indicates Deficits, Losses and Decreases.

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF JANUARY, 1912 (CONTINUED).

Name of road.	Mileage operated at end of period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total, inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	General.	Total.					
Lehigh Valley	1,450[20]	2,484,918	278,831	2,868,305	317,302	561,480	76,944	1,090,569	68,870	2,115,165	753,140	—34,954	130,000	588,186	—222,082
Long Island	398[21]	232,485	400,581	666,358	114,832	110,019	8,755	383,663	21,037	638,306	28,052	16,364	56,450	—12,034	—13,066
Louisville & Nashville	4,704[22]	3,299,884	962,715	4,535,545	729,288	851,513	98,080	1,600,861	100,950	3,380,692	1,154,853	—7,239	148,950	998,664	63,695
Louisville, Henderson & St. Louis	199	69,345	30,372	106,999	21,081	14,229	4,510	42,826	2,830	85,476	21,523	159	3,000	18,682	4,533
Louisiana & Arkansas	255	104,735	16,232	125,246	22,148	18,516	2,341	35,399	4,703	83,107	42,139	.....	4,233	37,906	—7,314
Maine Central	1,203[23]	503,746	182,071	731,622	104,641	127,377	6,998	349,777	21,734	610,527	121,095	—4,488	42,897	73,710	—53,276
Michigan Central	1,816[24]	1,632,721	535,292	2,388,902	235,872	359,540	60,677	1,104,612	44,129	1,804,830	584,072	1,532	116,000	469,604	242,000
Midland Valley	373[25]	71,474	37,236	117,231	28,329	15,131	2,880	40,424	6,616	93,380	23,851	51	7,592	16,310	—1,306
Missouri Pacific	3,915[26]	1,253,349	323,200	1,750,523	222,172	242,803	57,691	976,591	68,015	1,567,272	183,251	—4,486	82,600	96,165	179,423
Monongahela	64	111,723	2,384	115,508	10,668	12,153	479	26,489	1,932	51,721	63,787	.....	2,000	61,787	9,885
Nashville, Chattanooga & St. Louis	1,255	659,950	235,797	974,602	147,058	184,545	40,165	371,152	25,117	768,037	206,565	—891	23,816	181,858	—85,915
Nevada Northern	165	108,571	10,786	122,573	11,858	16,220	381	27,594	3,680	59,733	62,840	.....	5,500	57,340	—2,106
New Orleans & North Eastern	195	233,156	49,526	307,860	27,206	58,581	9,401	131,850	11,692	238,730	69,130	—955	8,300	59,875	—19,225
New Orleans, Mobile & Chicago	404	126,517	26,429	163,446	23,556	19,892	2,817	52,927	7,964	107,156	56,290	—48	4,154	52,088	15,727
New York Central & Hudson River	3,596	4,961,114	2,283,677	8,061,535	940,581	1,600,045	150,456	3,564,643	213,617	6,469,342	1,592,193	43,866	556,924	1,079,135	357,153
New York, Chicago & St. Louis	562	745,586	107,562	883,964	85,880	107,665	47,071	472,173	17,320	731,109	153,585	—2,667	32,000	118,918	—28,008
New York, New Haven & Hartford	2,091[27]	2,413,167	1,974,399	4,883,603	424,332	644,937	35,005	2,253,507	152,841	3,510,622	1,372,981	107,654	310,000	1,170,635	—54,821
New York, Ontario & Western	565[28]	553,345	74,392	649,182	81,162	133,051	9,676	301,851	17,559	543,299	105,883	—2,520	17,917	85,446	—5,841
New York, Philadelphia & Norfolk	112	174,681	30,593	225,254	22,042	44,632	3,701	108,713	11,968	191,056	34,198	.....	7,900	26,298	—17,545
Norfolk & Western	2,004[29]	2,488,709	327,667	2,938,264	273,503	662,197	57,521	1,012,546	66,771	2,072,538	865,726	—1,087	120,000	744,639	—118,855
Norfolk Southern	607	158,010	56,393	233,349	29,842	30,093	4,821	86,797	13,172	164,725	68,624	—77	7,500	61,047	—8,249
Northern Central	473[30]	725,366	160,327	955,598	152,597	235,179	12,090	557,743	25,055	982,664	—27,066	83	36,175	—63,158	77,746
Northern Pacific	6,034[31]	2,675,379	931,262	3,918,672	381,896	552,187	86,119	1,871,908	108,838	3,000,948	917,724	—8,625	221,366	687,733	—329,641
Oregon Short Line	1,761[32]	1,043,091	284,612	1,452,422	137,492	201,459	29,940	451,900	38,411	859,202	593,220	—3,048	100,000	490,172	—43,717
Oregon-Washington R. R. & Nav. Co.	1,919[33]	605,101	313,678	1,024,161	159,184	169,982	42,866	487,009	47,175	906,216	117,945	—707	88,089	29,149	—222,293
Pecos & Northern Texas	478[34]	130,565	34,824	175,033	24,061	43,556	2,701	80,621	5,709	156,648	18,385	.....	6,045	12,340	696
Pennsylvania Co.	1,760[35]	2,784,736	686,656	3,886,505	555,696	769,131	75,067	1,683,085	93,395	3,176,374	710,131	—1,103	198,585	510,443	114,494
Pennsylvania Railroad	4,017[36]	9,359,766	2,473,970	12,780,390	1,632,477	2,842,728	158,854	5,462,686	362,713	10,459,458	2,320,932	—148,438	564,473	1,608,021	—162,419
Peoria & Eastern	351	165,860	49,558	230,953	31,134	40,182	4,149	120,670	5,411	201,546	29,407	.....	9,800	19,607	—26,280
Pere Marquette	2,332[37]	769,155	268,993	1,157,198	159,532	245,731	34,918	704,493	34,187	1,178,861	—21,663	—7,025	56,517	—85,205	—69,093
Philadelphia, Baltimore & Washington	713	642,016	606,032	1,436,741	219,578	274,193	30,902	721,062	37,441	1,283,176	153,565	.....	49,268	104,297	—51,004
Pittsburg & Lake Erie	215[38]	1,089,991	105,015	1,232,863	132,772	224,011	11,782	341,320	24,360	734,245	498,618	—363	31,000	467,255	56,045
Pittsburg, Cincinnati, Chic. & St. Louis	1,467	2,227,329	591,844	3,204,825	372,907	645,855	68,805	1,319,808	69,144	2,476,519	728,306	—842	119,241	608,223	16,905
Santa Fe, Prescott & Phoenix	364†	60,409	26,595	100,064	17,237	8,522	2,379	26,517	3,849	58,504	41,560	.....	2,777	38,783	.....
St. Joseph & Grand Island	319	79,194	27,371	118,175	11,152	29,562	4,762	60,007	6,284	111,767	6,408	—16	6,396	—4	—13,583
St. Louis, Iron Mountain & Southern	3,314[39]	1,683,670	475,083	2,329,112	288,898	262,133	55,798	904,635	74,883	1,586,347	742,765	—2,683	83,615	656,467	—166,472
St. Louis Southwestern	796	428,646	101,926	566,610	59,612	94,599	27,608	181,162	27,100	390,081	176,529	—846	22,563	153,120	—120,814
San Pedro, Los Angeles & Salt Lakes	1,115[40]	432,033	213,010	690,712	92,437	200,367	29,801	289,195	16,633	628,433	62,279	—5,947	24,177	32,155	—22,765
Southern	7,088[41]	3,176,861	1,284,486	4,852,377	623,111	792,292	141,900	1,912,325	166,893	3,636,521	1,215,856	7,230	204,919	1,018,167	—162,495
Southern in Mississippi	280	55,199	30,684	93,926	20,596	11,142	2,846	42,013	4,759	81,356	12,570	.....	4,056	8,514	—25,937
Southern Kansas of Texas	124	68,391	14,537	87,383	10,802	27,890	1,750	47,538	3,130	90,820	—3,437	.....	2,571	—6,008	—16,446
Southern Pacific Co.	6,195	3,767,410	2,437,498	6,703,398	765,832	1,061,627	182,935	2,288,817	184,164	4,483,375	2,220,023	—39,355	358,519	1,822,149	—16,114
Syracuse, Binghamton & New York	80	45,370	27,253	83,629	3,700	7,831	3,027	36,323	2,523	53,404	30,225	.....	6,820	23,405	—1,995
Texas & New Orleans	458	198,682	78,172	296,400	53,981	78,831	8,593	134,609	11,343	287,357	9,043	190	13,683	—4,450	—47,190
Toledo, Peoria & Western	247	76,323	31,376	113,664	14,093	23,338	2,217	45,924	3,425	88,997	24,667	.....	4,800	19,867	14,505
Toledo, St. Louis & Western	450	251,022	26,876	299,078	27,010	55,777	8,109	121,826	8,450	221,172	77,906	.....	14,250	63,656	20,117
Union Pacific	3,537[42]	2,011,063	754,878	3,164,932	258,230	535,716	90,681	1,238,572	125,976	2,249,175	915,757	—6,423	159,960	749,374	—525,533
Union R. R. of Baltimore	9	99,633	19,302	120,603	9,777	.....	793	5,882	2,276	17,142	103,461	.....	5,414	98,047	1,709
Union R. R. of Pennsylvania	31	.....	.....	224,136	15,569	86,461	100	130,439	2,467	235,036	—10,900	2,318	4,750	—13,332	32,868
Vandalia	827	574,499	176,689	848,990	88,373	162,616	24,345	378,642	17,979	672,955	177,035	.....	28,010	149,025	22,383
Vicksburg, Shreveport & Pacific	171	74,231	36,429	122,499	22,702	22,859	3,167	41,190	4,626	94,544	27,955	—50	6,600	21,305	—9,859
Virginian	474[43]	382,986	17,050	411,319	48,712	75,189	5,502	111,154	7,831	248,388	162,931	4,717	17,600	150,048	36,060
West Jersey & Seashore	355[44]	127,433	164,895	319,687	92,964	71,987	10,968	221,766	11,016	408,701	—89,014	—4,824	29,902	—123,740	58,341
Wheeling & Lake Erie	457	486,007	41,140	561,987	51,804	113,478	7,346	211,111	13,246	396,985	165,002	4,377	32,035	137,344	44,918
Yazoo & Mississippi Valley	1,371	546,899	206,482	816,756	180,083	163,554	15,542	383,092	27,008	769,279	47,477	—51	37,904	9,522	—371,999

Operated in the previous year—[20] 1,433; [21] 395; [22] 4,591; [23] 1,179; [24] 1,803; [25] 323; [26] 3,919; [27] 2,041; [28] 545; [29] 1,990; [30] 468; [31] 6,028; [32] 1,646; [33] 1,636; [34] 296; [35] 1,415; [36] 3,976; [37] 2,334; [38] 191; [39] 3,316; [40] 1,105; [41] 7,038; [42] 3,472; [43] 473; [44] 353. — Indicates Deficits, Losses and Decreases.

† Figures shown here are for the period January 1 to 21 (inc.). On the 22nd this road was merged into the Atchison, Topeka & Santa Fe.

REVENUES AND EXPENSES OF RAILWAYS.

SEVEN MONTHS OF FISCAL YEAR, 1912.

Name of road.	Mileage operated at end of period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total, inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	General.	Total.					
Alabama & Vicksburg	142	$623,477	$309,850	$1,003,132	$148,786	$190,944	$25,991	$342,896	$36,040	$744,657	$258,475	—$2,423	$34,696	$221,355	—$91,168
Alabama Great Southern	309	1,849,919	713,352	2,797,351	307,658	621,261	77,498	850,673	67,114	1,924,204	873,147	—2,777	104,974	765,396	44,436
Atchison, Topeka & Santa Fe.	7,977[1]	34,107,879	13,547,775	51,740,869	8,432,207	8,060,071	1,145,423	15,305,864	1,121,940	34,065,505	17,675,364	.....	2,076,772	15,598,592	—2,345,246
Atlanta, Birmingham & Atlantic	661	1,434,042	420,291	1,956,948	206,700	318,925	116,999	719,136	74,460	1,432,220	524,728	.....	95,000	429,728	76,175
Atlantic & St. Lawrence	166	600,592	192,360	871,734	234,972	153,099	30,596	403,036	23,780	845,483	26,251	.....	46,611	—20,360	—7,943
Atlantic Coast Line	4,526[2]	12,441,624	4,738,517	18,534,583	2,466,374	2,760,985	315,904	6,419,670	502,182	12,465,115	6,069,468	.....	749,000	5,320,468	64,029
Baltimore & Ohio Chicago Terminal	77	.....	16,710	924,120	191,795	121,670	6,396	405,762	36,625	762,248	161,872	$5,808	127,444	40,236	19,837
Bangor & Aroostook	627	1,450,049	395,432	1,952,621	320,884	223,830	28,692	598,013	80,516	1,251,935	700,686	.....	65,875	634,811	43,007
Bessemer & Lake Erie	203[3]	4,832,073	222,003	5,116,489	495,667	925,193	59,472	1,258,439	74,779	2,813,550	2,302,939	.....	76,474	2,226,465	558,772
Boston & Maine	2,244[3*]	15,506,519	9,834,914	27,337,276	3,811,093	3,707,340	272,729	12,385,913	599,032	20,776,107	6,561,169	123,297	1,222,325	5,462,141	—29,558
Butte, Anaconda & Pacific	46	545,711	64,450	652,741	71,108	120,975	4,814	291,673	19,860	508,430	144,311	.....	15,764	128,547	—7,349
Canadian Pacific Lines in Maine	233	447,936	169,872	661,167	157,260	110,841	35,739	295,474	30,828	630,142	31,025	.....	49,000	—17,975	36,838
Carolina, Clinchfield & Ohio	238[4]	1,110,438	93,760	1,234,371	79,221	150,537	36,781	246,703	54,455	567,697	666,674	1,138	54,000	613,812	231,787
Carolina, Clinchfield & Ohio of S. C.	17	62,305	11,139	75,421	4,028	638	6,638	18,356	3,342	33,002	42,419	.....	3,500	38,919	13,429
Central of Georgia	1,915	5,291,427	2,334,780	8,390,478	1,029,663	1,526,388	239,046	2,785,328	266,634	5,847,059	2,543,419	40,394	346,856	2,236,957	—57,672
Central New England	276	1,686,872	208,733	1,993,978	324,470	149,276	9,150	527,715	20,312	1,030,923	963,055	—2,965	63,000	897,090	231,563
Charleston & Western Carolina	340	848,276	230,721	1,139,119	208,588	159,273	20,841	414,084	30,802	833,588	305,531	.....	35,000	270,531	—43,619
Chicago & Alton	1,025	5,723,875	2,561,385	8,941,100	1,268,705	1,694,711	280,161	3,217,392	232,444	6,693,413	2,247,687	—22,901	255,000	1,969,786	134,636
Chicago & Eastern Illinois	1,275*a*	6,928,760	1,784,453	9,381,434	1,035,073	1,763,716	206,379	3,365,910	288,824	6,659,902	2,721,532	—11,970	248,093	2,461,469	—260,159
Chicago & Northwestern	7,928[5]	27,570,736	12,222,928	44,163,268	5,763,009	5,902,183	828,026	18,066,112	857,978	31,417,308	12,745,960	—20,492	1,925,000	10,800,468	—1,006,690
Chicago, Burlington & Quincy	9,074[6]	34,501,542	13,268,644	52,479,774	6,088,993	8,895,518	898,167	16,619,235	1,314,522	33,816,525	18,664,249	—67,043	1,850,921	16,745,285	—563,319
Chicago, Indiana & Southern	358*b*	2,001,343	186,763	2,277,950	326,106	503,491	52,377	835,126	58,845	1,775,945	502,005	1,883	88,099	415,789	93,137
Chicago, Milwaukee & Puget Sound	2,058[7]	7,430,474	1,601,672	9,355,107	661,350	997,593	345,011	3,465,234	144,105	5,613,293	3,741,814	122,183	613,054	3,250,943	—331,217
Chicago, Milwaukee & St. Paul	7,511	25,153,104	8,662,791	37,600,903	5,380,529	5,508,520	745,551	15,420,753	680,047	27,735,400	9,865,503	—1,712	1,692,198	8,171,593	—996,348
Chicago, Peoria & St. Louis	255	740,353	219,859	1,009,687	133,196	202,467	51,346	445,312	42,125	874,446	135,241	.....	30,100	105,141	26,782
Chicago, Rock Island & Pacific	7,551[8]	23,372,630	11,315,661	37,067,078	5,505,084	4,983,181	1,099,797	14,692,956	1,018,870	27,299,888	9,767,190	—110,487	1,541,010	8,115,693	—1,888,439
Chicago, St. Paul, Minneapolis & Omaha	1,743	5,634,851	2,864,699	9,159,528	1,135,905	1,059,550	186,901	3,670,364	212,872	6,265,592	2,893,936	4,445	462,994	2,435,387	—790,407
Cincinnati, Hamilton & Dayton	1,014	4,373,257	1,029,585	6,056,347	617,900	984,232	135,238	2,492,419	134,155	4,363,944	1,692,403	.....	268,813	1,423,590	245,241
Cincinnati, New Orleans & Texas Pacific	337	4,269,014	1,066,774	5,618,383	566,227	1,189,240	139,505	1,604,424	128,029	3,627,425	1,990,958	—2,558	152,600	1,835,800	—155,654
Cincinnati Northern	244*c*	622,135	139,359	800,208	148,191	156,107	19,137	314,968	21,044	659,447	140,761	.....	40,392	100,369	—35,040
Cleveland, Cincinnati, Chic. & St. Louis.	2,011*d*	11,936,798	4,768,845	18,250,694	1,974,908	2,901,683	540,680	7,159,830	383,737	12,959,838	5,290,856	—18,037	677,512	4,595,307	1,187,509
Colorado & Southern	1,052[9]	3,822,231	897,403	5,057,922	574,584	960,630	79,125	1,582,106	160,588	3,357,033	1,700,889	—7,777	181,900	1,511,212	—336,618
Cumberland Valley	162	1,243,180	406,759	1,731,527	303,746	219,706	32,549	558,268	54,754	1,169,023	562,504	3,149	42,103	523,550	—180,693
Delaware, Lackawanna & Western	958[10]	15,925,669	4,693,520	21,997,210	2,553,200	3,449,899	465,776	6,513,667	457,065	13,439,607	8,557,603	250,141	1,169,940	7,637,804	—388,573
Denver & Rio Grande	2,544*e*	10,529,552	3,153,309	14,297,815	1,940,428	2,491,277	382,309	5,038,982	350,462	10,203,458	4,094,357	—6,218	520,000	3,568,139	—753,057
Denver, Northwestern & Pacific	214	533,651	218,015	785,315	98,109	114,999	17,136	267,970	23,298	521,512	263,803	.....	22,500	241,303	14,118
Detroit & Mackinac	358[11]	446,859	211,323	702,724	130,658	123,820	17,324	230,366	22,011	524,179	178,545	1,686	60,205	120,026	—68,004
Detroit, Grand Haven & Milwaukee	190	808,406	401,128	1,390,203	161,466	181,294	48,560	691,150	31,898	1,114,368	275,835	—426	20,159	255,250	44,733
Duluth & Iron Range	200[12]	4,309,486	153,487	4,530,703	587,941	375,076	6,142	829,535	84,538	1,883,232	2,647,471	11,765	219,564	2,439,672	—455,425
Duluth, Missabe & Northern	341[13]	4,388,695	265,965	4,716,473	697,127	452,641	13,327	828,378	98,162	2,089,635	2,626,838	36,787	229,707	2,433,918	—2,190,420
Elgin, Joliet & Eastern	841*f*	5,404,678	29	5,708,455	533,999	1,055,214	28,836	1,678,495	116,083	3,412,627	2,295,828	.....	136,738	2,159,090	782,462
Florida East Coast	629*g*	1,015,679	717,868	1,993,265	387,999	333,360	48,574	790,235	63,750	1,623,918	369,347	—303	108,500	260,544	—79,425
Fort Worth & Denver City	454	1,974,951	944,727	3,068,096	253,998	453,958	49,790	989,149	96,615	1,843,510	1,224,586	—4,107	82,791	1,137,688	—171,158
Galveston, Harrisburg & San Antonio	1,338	4,536,870	1,713,823	6,402,919	786,796	1,108,103	228,376	2,423,891	190,515	4,737,681	1,665,238	—35,753	277,605	1,351,880	—403,186
Grand Rapids & Indiana	586[14]	1,685,617	1,122,892	3,045,454	314,499	494,357	79,447	1,260,273	103,976	2,252,552	792,902	—351	160,852	631,699	140,953
Grand Trunk Western	347	2,378,564	1,342,606	3,964,994	386,764	576,384	135,565	1,586,002	95,095	2,779,810	1,185,184	—6,686	221,446	957,052	183,311
Great Northern	7,344[15]	29,251,499	8,427,889	40,424,465	4,317,187	4,434,661	639,599	10,799,974	710,754	20,902,175	19,522,290	104,806	1,929,834	17,697,262	3,247,874
Gulf & Ship Island	307	824,521	253,931	1,173,730	156,008	210,377	17,051	335,664	57,770	776,870	396,860	.....	31,770	365,090	—39,876
Gulf, Colorado & Santa Fe	1,597[16]	5,379,958	1,846,836	7,688,123	1,308,365	1,098,648	184,758	2,836,113	227,729	5,655,613	2,032,510	.....	260,790	1,771,720	—79,292
Houston, East & West Texas	190	524,887	202,338	768,825	141,064	80,271	12,946	251,074	25,774	511,129	257,696	.....	30,722	226,974	—51,653
Houston & Texas Central	789	2,398,180	1,132,509	3,793,108	509,534	613,835	128,793	1,478,229	146,703	2,877,094	916,014	—9,167	160,251	746,596	—373,646
Illinois Central	4,755[17]	21,859,806	8,175,391	34,452,360	5,011,029	8,220,880	815,748	13,584,827	901,967	28,534,451	5,917,909	—55,465	1,616,125	4,246,319	—5,160,382
Indiana Harbor Belt	104[18]	.....	.....	1,466,446	185,573	158,076	20,248	664,738	53,817	1,082,452	383,994	22,742	28,437	378,299	207,919
Kansas City Southern	827	3,934,537	973,165	5,519,119	564,615	810,070	187,610	1,918,830	210,912	3,692,037	1,827,022	.....	238,594	1,588,488	—492,740
Lake Erie & Western	886	2,559,295	573,407	3,322,419	465,915	565,779	90,009	1,291,351	77,130	2,490,184	832,235	.....	138,296	693,939	86,490
Lake Shore & Michigan Southern	1,775[19]	18,773,933	7,185,293	29,463,831	3,105,235	3,795,797	604,332	9,456,790	518,183	17,480,337	11,983,494	—6,866	1,003,940	10,972,688	3,863,855

Operated in the previous year—[1] 7,526; [2] 4,494; [3] 204; [3*] 2,242; [4] 236; [5] 7,743; [6] 9,091; [7] 1,997; [8] 7,548; [9] 1,180; [10] 930; [11] 360; [12] 190; [13] 316; [14] 587; [15] 7,274; [16] 1,518; [17] 4,575; [18] 113; [19] 1,662.
a 1,276; *b* 340; *c* 245; *d* 1,978; *e* 2,541; *f* 831; *g* 583. — Indicates Deficits, Losses and Decreases.

REVENUES AND EXPENSES OF RAILWAYS.

SEVEN MONTHS OF FISCAL YEAR, 1912 (CONTINUED).

Name of road.	Mileage operated at end of period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total, inc. misc.	Maintenance: Way and structures.	Maintenance: Of equipment.	Traffic.	Transportation.	General.	Total.					
Lehigh Valley	1,450[20]	18,951,152	2,974,540	22,608,302	2,568,296	3,901,067	570,566	7,608,190	478,525	15,126,644	7,571,658	—175,236	801,700	6,594,722	—264,496
Long Island	398[21]	1,931,441	4,294,130	6,500,714	849,086	763,644	99,798	2,855,441	147,299	4,715,268	1,785,446	447,680	377,771	1,855,355	250,522
Louisiana & Arkansas	255	643,620	129,651	806,365	148,143	125,085	16,389	223,051	33,139	545,807	260,358	.....	24,233	236,325	—62,948
Louisville & Nashville	4,704[22]	23,581,993	7,323,225	32,858,684	4,964,542	5,763,269	665,351	10,409,069	622,000	22,424,231	10,434,453	—14,028	1,042,650	9,377,775	524,427
Louisville, Henderson & St. Louis	199	462,939	249,122	758,506	167,586	94,678	30,133	251,609	21,228	565,234	193,272	2,360	21,000	174,632	10,773
Maine Central	1,203[23]	3,843,179	2,108,970	6,331,225	1,183,460	789,990	64,776	2,297,339	183,687	4,519,252	1,811,973	27,092	299,580	1,539,485	160,952
Michigan Central	1,816[24]	11,799,667	4,898,162	18,493,978	2,118,117	2,052,185	464,110	6,966,344	310,605	11,911,361	6,582,617	27,346	798,371	5,811,592	2,188,866
Midland Valley	373[25]	573,537	271,461	900,002	191,689	140,079	21,382	281,815	44,105	679,070	220,932	704	40,497	181,139	—19,111
Missouri Pacific	3,915[26]	10,580,897	2,892,283	14,819,475	2,691,098	2,903,034	423,525	6,747,769	498,385	13,263,811	1,555,664	—26,090	578,200	951,374	—436,145
Monongahela	64	691,077	16,767	717,937	101,618	55,669	2,364	153,318	13,452	326,421	391,516	.....	19,430	372,086	39,511
Nashville, Chattanooga & St. Louis	1,255	4,779,897	1,785,224	7,057,712	1,074,750	1,311,702	260,304	2,579,520	176,515	5,402,791	1,654,921	—7,382	166,712	1,480,827	—139,819
Nevada Northern	165	722,160	76,009	818,729	88,915	104,123	2,774	175,898	24,135	395,845	422,884	.....	33,666	389,218	—67,824
New Orleans & North Eastern	195	1,649,808	374,995	2,171,547	203,697	404,679	63,339	803,973	80,003	1,555,691	615,856	—5,476	61,871	548,509	—86,729
New Orleans, Mobile & Chicago	404	843,358	216,210	1,125,873	167,192	121,571	19,432	339,861	56,048	704,104	421,769	—252	31,820	389,697	—35,907
New York Central & Hudson River	3,596*h*	36,465,187	19,648,944	62,633,119	8,247,824	9,622,488	1,270,339	22,885,997	1,526,022	43,552,670	19,080,449	259,784	3,599,286	15,740,947	2,770,912
New York, Chicago & St. Louis	562*i*	5,476,733	1,012,692	6,749,897	774,879	694,640	325,661	2,746,077	117,870	4,659,127	2,090,770	—10,657	233,125	1,846,988	203,122
New York, New Haven & Hartford	2,091[27]	18,105,490	16,257,636	37,846,605	4,053,722	4,393,565	230,992	14,458,162	1,117,503	24,253,944	13,592,661	857,850	2,220,000	12,230,511	449,539
New York, Ontario & Western	565[28]	4,088,363	1,124,939	5,426,516	781,180	910,674	68,521	2,043,804	120,192	3,924,371	1,502,145	—5,591	125,417	1,371,137	—240,600
New York, Philadelphia & Norfolk	112	1,526,907	280,917	1,953,263	208,478	344,541	28,337	768,493	85,723	1,435,572	517,691	.....	52,900	464,791	—73,348
Norfolk & Western	2,004[29]	19,423,626	2,681,097	22,923,835	2,738,496	4,388,172	366,496	6,692,974	442,148	14,628,286	8,295,549	—15,783	810,000	7,469,766	400,664
Norfolk Southern	607	1,155,988	521,645	1,827,633	209,612	223,552	39,405	599,912	92,745	1,165,226	662,407	—3,285	52,500	606,622	17,843
Northern Central	473[30]	5,642,079	1,401,440	7,493,662	756,888	1,557,001	103,671	3,758,559	167,628	6,343,747	1,149,915	4,250	278,195	875,970	69,073
Northern Pacific	6,034[31]	26,306,687	9,579,418	38,398,442	4,696,024	4,108,542	680,616	12,293,276	594,373	22,372,831	16,025,610	282,943	1,945,345	14,363,208	—540,697
Oregon Short Line	1,761[32]	8,942,688	2,870,915	12,564,050	1,400,242	1,209,177	199,030	3,051,552	248,935	6,108,936	6,455,114	—380	891,691	5,563,043	—175,355
Oregon-Washington R. R. & Nav. Co.	1,919[33]	6,128,704	3,073,672	9,874,238	1,265,801	999,823	304,377	3,426,829	298,331	6,295,161	3,579,077	13,638	769,651	2,823,064	.....
Pecos & Northern Texas	478[34]	845,065	226,809	1,122,297	166,845	227,330	17,033	381,780	34,536	827,524	294,773	.....	28,840	265,933	—28,531
Pennsylvania Co.	1,760[35]	23,408,698	5,272,570	31,357,686	4,081,649	5,556,628	523,025	10,752,219	605,959	21,519,480	9,838,206	—8,968	1,322,621	8,506,617	—428,485
Pennsylvania Railroad	4,017[36]	68,000,032	20,583,795	94,942,121	10,790,608	18,665,624	1,285,347	34,880,685	2,400,172	68,022,436	26,919,685	—899,331	4,200,060	21,820,294	739,086
Peoria & Eastern	351	1,307,146	439,751	1,884,959	249,686	267,859	37,482	770,923	40,594	1,366,544	518,415	.....	68,003	450,412	—85,405
Pere Marquette	2,332[37]	6,796,705	2,608,236	10,250,924	1,243,221	1,592,855	255,172	4,545,340	228,566	7,865,154	2,385,770	—19,469	397,527	1,968,774	169,083
Philadelphia, Baltimore & Washington	713	5,399,439	4,672,492	11,231,647	1,546,760	1,913,461	187,454	4,620,519	258,790	8,526,984	2,704,663	.....	35,345	2,351,208	—8,917
Pittsburg & Lake Erie	215[38]	8,383,752	933,459	9,604,127	1,025,479	1,543,230	91,868	2,234,869	166,090	5,061,536	4,542,591	—1,887	208,389	4,332,315	—557,140
Pittsburg, Cincinnati, Chic. & St. Louis	1,467	16,196,492	4,873,394	23,703,146	3,266,790	4,324,547	479,954	8,405,595	460,726	16,937,612	6,765,534	—6,078	889,638	5,869,818	238,906
St. Joseph & Grand Island	319	614,861	263,290	961,341	164,661	143,603	35,403	421,007	39,606	804,280	157,061	60	48,879	108,242	1,856
St. Louis, Iron Mountain & Southern	3,314[39]	13,027,723	3,699,396	17,927,476	3,077,167	2,682,651	372,210	5,752,897	492,523	12,378,448	5,549,028	—40,179	576,055	4,932,794	363,204
St. Louis Southwestern	796	3,467,748	832,375	4,538,141	406,640	741,411	198,590	1,120,276	165,546	2,632,463	1,905,678	—6,987	145,788	1,752,903	—115,941
San Pedro, Los Angeles & Salt Lakes	1,115[40]	3,006,643	1,726,995	5,073,140	877,666	1,147,977	223,769	1,988,476	119,337	4,357,225	715,915	—28,847	172,939	514,129	—377,728
Santa Fe, Prescott & Phoenix	364†	614,704	247,814	925,357	141,421	85,766	20,817	267,348	37,009	552,361	372,996	.....	23,346	349,650	.....
Southern	7,088[41]	23,888,398	10,371,516	37,199,614	4,371,850	5,905,404	954,913	12,690,831	1,093,480	25,016,478	12,183,136	45,907	1,423,571	10,805,472	123,169
Southern in Mississippi	280	420,199	244,993	718,575	157,533	63,370	17,066	268,576	26,969	533,514	185,061	.....	35,356	149,705	—29,178
Southern Kansas of Texas	124	624,077	110,268	766,425	126,306	164,612	14,610	290,675	28,584	624,787	141,638	.....	18,328	123,310	—109,315
Southern Pacific Co.	6,195*j*	32,087,060	18,608,216	54,406,535	6,203,151	6,546,419	1,212,352	15,557,928	1,359,316	30,879,166	23,527,369	206,107	2,286,190	21,447,286	—1,087,217
Syracuse, Binghamton & New York	80	352,522	250,129	685,376	86,116	45,216	19,419	242,224	16,397	409,372	276,004	.....	44,140	231,864	—3,172
Texas & New Orleans	458	1,508,594	615,945	2,267,596	383,819	508,496	55,489	891,110	71,158	1,910,072	351,524	—2,582	104,394	244,548	—139,086
Toledo, Peoria & Western	247	447,721	277,306	769,743	121,891	165,865	16,213	288,677	23,780	616,426	153,317	.....	33,600	119,717	—16,110
Toledo, St. Louis & Western	450	1,929,923	282,661	2,360,158	282,603	434,758	57,525	857,007	61,195	1,693,088	667,070	.....	101,250	565,820	—72,200
Union Pacific	3,537[42]	20,202,699	6,427,146	29,251,257	2,648,638	3,460,279	745,926	8,200,036	748,308	15,803,187	13,448,070	—7,098	1,195,967	12,245,005	—2,843,383
Union R. R. of Baltimore	9	726,189	145,337	882,928	74,752	.....	5,116	39,096	16,548	135,512	747,416	.....	40,952	706,464	—63,687
Union R. R. of Pennsylvania	31	.....	.....	2,552,876	213,781	567,306	714	895,150	25,926	1,702,877	849,999	26,662	48,573	828,088	313,724
Vandalia	827	3,887,940	1,478,919	6,049,321	854,323	1,133,460	184,383	2,345,844	133,523	4,651,533	1,397,788	.....	197,332	1,200,456	—167,783
Vicksburg, Shreveport & Pacific	171	491,769	301,965	868,309	154,979	151,546	21,977	270,367	32,308	631,177	237,132	—1,498	49,071	186,563	—80,647
Virginian	474[43]	2,526,491	164,136	2,767,728	325,266	492,066	35,435	759,380	55,235	1,667,382	1,100,346	37,152	106,200	1,031,298	224,595
Wheeling & Lake Erie	457	3,885,698	382,239	4,558,761	534,299	798,504	52,214	1,467,925	97,674	2,950,616	1,608,145	18,401	205,325	1,421,221	299,125
West Jersey & Seashore	355[44]	1,125,662	2,595,340	3,979,969	597,555	681,549	96,896	1,665,718	73,778	3,115,496	864,473	—24,708	160,742	679,023	—191,806
Yazoo & Mississippi Valley	1,371	4,026,896	1,616,386	6,078,679	1,174,948	892,880	113,193	2,312,215	185,822	4,679,058	1,399,621	—2,058	265,887	1,131,676	—866,394

Operated in the previous year—[20] 1,433; [21] 395; [22] 4,591; [23] 1,179; [24] 1,803; [25] 323; [26] 3,919; [27] 2,041; [28] 545; [29] 1,990; [30] 468; [31] 6,028; [32] 1,646; [33] 1,636; [34] 296; [35] 1,415; [36] 3,976; [37] 2,334; [38] 191; [39] 3,316; [40] 1,105; [41] 7,038; [42] 3,472; [43] 473; [44] 353. *h* 3,591; *i* 561; *j* 6,187. — Indicates Deficits, Losses and Decreases.

†Figures shown here are for the period July 1, 1911 to January 21, 1912 (inc.). On January 22 this road was merged into the Atchison, Topeka & Santa Fe.

Complaint Dismissed.

Merchants' and Manufacturers' Association of Baltimore et al. v. Atlantic Coast Line et al. Opinion by the commission.

The rate charged on iron girders which are too long to be loaded into box cars is not found unreasonable. (22 I. C. C., 467.)

Rate on Wire Reduced.

Leggett & Platt Spring Bed & Manufacturing Co. v. Missouri Pacific et al. Opinion by the commission:

A rate of 33 cents per 100 lbs. for plain wire, C. L., from Waukegan, Ill., to Carthage, Mo., found to be unreasonable. (22 I. C. C., 513.)

STATE COMMISSIONS.

The Pennsylvania commission has declined to consider a petition for better train service on the Northern Central between York and New Freedom, holding that, as the trains run through to Baltimore, Md., and are engaged in interstate traffic, the commission cannot interfere with them; but the commission will do what is proper and practicable toward securing the establishment of a new local train.

COURT NEWS.

The New York, Chicago & St. Louis and the Lehigh Valley have entered pleas of not guilty in the United States district court at Chicago to indictments charging the payment of rebates to Booth & Company, now the Booth Fisheries, which were returned in 1907. A petition for a demurrer filed some months ago was overruled by the court.

The constitutionality of an act passed by the Indiana legislature in 1909 authorizing the railway commission to investigate and regulate the condition and efficiency of locomotive headlights was upheld by Judge Carter of the Superior Court on March 2, in a decision on a demurrer of the state to a suit brought by the Vandalia to enjoin the commission from enforcing an order requiring the railways to equip their locomotives with headlights of a least 1,500 candle power. The court held that the commission has the authority to make such an order.

Six express companies operating in Indiana have filed in the federal court at Indianapolis suits for an injunction restraining the enforcement of an order of the railway commission reducing express rates within the state, approximately 15 per cent. The injunction is asked on the ground that the order is confiscatory, that the commission's methods of calculating the profits of the company were erroneous and that the commission included the earnings of the company from financial business, which are declared to be three times as great as those from the transportation business.

The Supreme Court of Missouri on March 1 denied the writ of ouster asked by the state against the Missouri Pacific, St. Louis, Iron Mountain & Southern and Wabash railways, the Pacific Express Company and the American Refrigerator Transit Company. The state sought to have the charters of the companies revoked on allegations that the Missouri Pacific held stock in the other companies and that the Wabash was a parallel and competing line. The court held that it was not unlawful for a railway to hold stocks in another company when it does not undertake to control the other corporation, and that the Wabash is not a parallel and competing line with reference to the Missouri Pacific.

Judge Landis of the United States district court at Chicago, on February 28, dismissed a petition of the Taylor Coal Company, Chicago, and the Security Coal & Mining Company, St. Louis, for an injunction restraining the Illinois Central from putting into effect an order of the Illinois railway commission requiring the distribution of coal cars to mines on the basis of the previous month's shipments. The coal companies contended that the order was discriminatory against interstate shipments. The injunction was refused on the ground that an appeal from the commission's order pending in the circuit court of Sangamon county acted as a stay. On February 29 the Illinois Central notified the commission that it would restore its former rules providing for a distribution on the basis of the average shipments during the nine months ended February 9.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

F. L. Wanklyn has been appointed general executive assistant of the Canadian Pacific, with office at Montreal, Que., and will perform such duties as may be assigned to him by the president.

H. B. Holbert, division freight agent of the Chicago Great Western at Des Moines, Iowa, has been elected vice-president and general manager of the Muscatine North & South, with office at Muscatine, Iowa.

W. K. Vanderbilt, Jr., assistant to president of the New York Central Lines at New York, has been elected vice-president of the New York Central & Hudson River and the Lake Shore & Michigan Southern, with office at New York.

W. C. Parker, who has been connected with the auditing department of the Union Pacific, has been appointed general auditor of the Illinois Central, with office at Chicago, succeeding J. W. Newlean, recently appointed comptroller of Wells, Fargo & Company.

Operating Officers.

William D. Trump, general superintendent of the Pere Marquette, with office at Detroit, Mich., has resigned.

E. Horton Turner has been appointed general superintendent of the Alabama & Mississippi, with office at Vinegar Bend, Ala.

Donald McDonald has been appointed superintendent of the Montreal & Ste. Flavie district of the Intercolonial Railway, with office at Levis, Que.

J. F. Chapman, general freight and passenger agent of the Oshawa Railway at Deseronto, Ont., has been appointed manager in charge of operation and traffic, with office at Deseronto.

F. H. Kahl has been appointed superintendent of telegraph of the Chicago, Rock Island & Gulf, with office at Fort Worth, Tex., succeeding E. D. Winslow, resigned on account of other duties.

J. E. McLean has been appointed acting assistant superintendent of the Galveston, Harrisburg & San Antonio, with office at San Antonio, Tex., succeeding T. H. Mooney, granted a leave of absence on account of illness.

Robert King, superintendent of district No. 1 of the Canadian Pacific, at Toronto, Ont., has been appointed superintendent of the London division, with office at London. H. G. Grant succeeds Mr. King, with office at Toronto.

F. B. Mitchell, trainmaster of the Baltimore & Ohio Southwestern at Seymour, Ind., has been appointed assistant superintendent; and C. A. Plumly, operator on the Indiana division at Cincinnati, Ohio, succeeds Mr. Mitchell.

George Hodge, whose appointment as general superintendent of the Eastern division of the Canadian Pacific, with office at Montreal, Que., has been announced in these columns, was born on October 2, 1874, at Montreal. He was educated in the public schools, and began railway work on March 24, 1890, as a clerk in the passenger department of the Canadian Pacific, and since that time has been in the continuous service of that company. In August, 1890, he was transferred in the same capacity to the vice-president's office, and in 1892 was made secretary to the vice-president. Four years later he was promoted to chief clerk to the vice-president, and from 1907 to 1908 he was superintendent of the Montreal terminals. He was then transferred as superintendent to district Three of the Eastern division, and in 1911 was again transferred as superintendent to district Two of the Ontario division, which position he held at the time of his recent appointment as general superintendent of the Eastern division.

Traffic Officers.

F. N. Hait has been appointed commercial agent of the Lehigh Valley, with office at Cleveland, Ohio.

G. H. Windsor has been appointed general freight agent of the Crystal City & Uvalde, with headquarters at Crystal City, Tex.

E. F. Stovall has been appointed a general agent in the freight department of the Central of Georgia, with office at Birmingham, Ala.

H. L. Burch, general freight and passenger agent of the Kentucky & Tennessee, with office at Stearns, Ky., has resigned to engage in other business.

T. H. Wilhelm, commercial agent of the Chicago, Rock Island & Gulf at Dallas, Tex., has been appointed assistant general freight agent, with headquarters at Fort Worth, Tex.

J. L. Cahoon has been appointed soliciting freight agent of the Queen & Crescent Route, with headquarters at Chattanooga, Tenn., succeeding E. F. Sisson, retired on a pension.

C. B. Brodie, chief clerk to the district passenger agent of the Pennsylvania Railroad at Washington, D. C., has been appointed Canadian passenger agent, with office at Toronto, Ont.

S. M. Patterson, commercial agent of the Missouri Pacific-Iron Mountain system at Atlanta, Ga., has been appointed commercial agent, with office at Greensboro, N. C., succeeding Norton England, promoted. C. M. Davis succeeds Mr. Patterson.

C. F. Reed, station agent of the Canadian Pacific at Greenville, Maine, has been appointed a traveling freight agent, with office at St. John, N. B., succeeding C. K. Howard, resigned to become right-of-way agent of the St. John & Quebec.

William West Ruth has been appointed foreign freight agent of the Baltimore & Ohio, with office at Baltimore, Md., succeeding Robert B. Ways, deceased, and Frederic J. Course has been appointed assistant foreign freight agent, with office at New York. J. L. Hayes, commercial freight agent of the Baltimore & Ohio at Wilmington, Del., has been appointed commercial freight agent, with office at Baltimore, Md., succeeding William West Ruth, promoted, and B. S. Dowdell succeeds Mr. Hayes.

John J. Stevens, traveling freight and passenger agent of the New Orleans Great Northern at Columbia, Miss., has been appointed commercial agent, with office at Jackson, and his former position has been abolished. The position of F. L. Merritt, general agent at Jackson, has also been abolished.

George S. Bruce has been appointed traveling immigration agent of the International & Great Northern, with headquarters at Houston, Tex., succeeding R. R. Claridge, recently appointed agricultural commissioner of the joint Texas immigration bureau of the St. Louis, Iron Mountain & Southern, the Texas & Pacific and the International & Great Northern.

C. W. Merrilies has been appointed general agent of the Chicago Great Western, with office at Butte, Mont., succeeding A. N. Johnson, resigned to go into other business. W. C. Hine has been appointed division freight agent, with office at Fort Dodge, Iowa, succeeding L. M. Foss, resigned. Loyd Jodon has been appointed division freight agent, with office at Des Moines, Iowa, succeeding H. B. Holbert, resigned to go to another company, and T. J. Cleary, agent at Waterloo, Iowa, has been appointed commercial agent, with office at Waterloo.

James Freeman, district passenger agent of the Southern Railway, at Atlanta, Ga., has been appointed division passenger agent, with office at Atlanta, Ga. Richard H. DeButts, traveling passenger agent at Charlotte, N. C., has been appointed division passenger agent, with office at Charlotte. Benjamin H. Todd, chief baggage clerk at Washington, D. C., has been appointed district passenger agent, with office at Louisville, Ky., succeeding A. R. Cook, who becomes city passenger agent at St. Louis, Mo.; Matthew H. Boone, district passenger agent at Dallas, Tex., succeeds Mr. Todd, and Robert B. Creagh, district passenger agent at Birmingham, Ala., succeeds Mr. Boone. Robert L. Baylor, traveling passenger agent at Chattanooga, Tenn., has been appointed division passenger agent, with office at Birmingham, Ala. James R. Martin, chief clerk to the assistant general passenger agent at Chattanooga, has been appointed district passenger agent, with office at Chattanooga, and Hubert C. Motley, succeeds Mr. Martin. Frank L. Jenkins, traveling passenger agent at Augusta, Ga., has been appointed district passenger agent, with office at Washington, D. C., and Alexander H. Acker, traveling passenger agent at Jacksonville, Fla., succeeds Mr. Jenkins; Charles P. Bostwick succeeds Mr. Acker. Harry J. New, traveling passenger agent at Kansas City, Mo., has been appointed traveling passenger agent, with office at Atlanta, and William Flannelly succeeds Mr. New. William C. Spencer, city passenger and ticket agent at Chattanooga, Tenn., has been appointed traveling passenger agent, with office at Chattanooga. J. A. Edwards, city passenger agent at St. Louis, Mo., has been appointed traveling passenger agent, with office at Chicago. C. R. Chesney, traveling passenger agent at Memphis, Tenn., has been appointed traveling passenger agent, with office at Cleveland, Ohio, and George A. Fisher, city passenger and ticket agent at Winston-Salem, N. C., succeeds Mr. Chesney.

Engineering and Rolling Stock Officers.

George Langton has been appointed master mechanic of the Texas & Pacific, with office at Marshall, Tex., succeeding O. A. Clarke, transferred to Dallas, Tex.

E. J. Wheeler has been appointed general car inspector of the Chicago, Burlington & Quincy, lines west of the Missouri river, with office at Lincoln, Neb., succeeding William Hansen, resigned.

John Pontius, road foreman of engines of the Pennsylvania Lines West at Columbus, Ohio, has been appointed general inspector of engines at Columbus, and C. S. White succeeds Mr. Pontius.

W. M. Bond, division engineer of the Baltimore & Ohio Southwestern at Chillicothe, Ohio, has been appointed division engineer of the Monongah division of the Baltimore & Ohio, and H. M. Hayward, assistant engineer of the Baltimore & Ohio Southwestern at Cincinnati, Ohio, succeeds Mr. Bond.

John T. Luscombe, whose appointment as master mechanic of the Cleveland, Cincinnati, Chicago & St. Louis, with office at Bellefontaine, Ohio, has been announced in these columns, was born June 29, 1874, at Queenstown, Cork county, Ireland. After a high school education at Belleville, Ont., in 1891, he began railway work with the Grand Trunk Railway at the same place. During the ten years from 1891 to 1901 he was with a number of roads as machinist, and also studied at the Scranton school. In May, 1901, he was made general foreman of the Baltimore & Ohio at Uhrichsville, Ohio, and was later transferred to Newark, Ohio, as machine shop foreman. In 1905 he went with the Chicago & Alton as machine shop foreman at Bloomington, Ill., and in September, 1907, became general foreman of the Toledo & Ohio Central at Bucyrus, Ohio. In March, 1908, he was promoted to master mechanic, which office he resigned to accept his present appointment. As outlined in another item in this column, Mr. Luscombe's jurisdiction extends over the consolidated motive power department of the Cleveland-Indianapolis and Cincinnati-Sandusky divisions of the Big Four and the Cincinnati Northern Railroad.

J. T. Luscombe.

W. P. Carroll, master mechanic of the Rochester division of the New York Central & Hudson River, with office at Rochester, N. Y., has been appointed master mechanic of the Mohawk division, with office at West Albany, N. Y., succeeding S. J. Delaney, who has been appointed assistant to master mechanic of the Mohawk division, with office at West Albany. W. J. Crandall succeeds Mr. Carroll, and M. H. Strauss has been appointed master mechanic of the River division, with office at New Durham, N. J., succeeding G. H. Eck.

H. M. Stone, division engineer of the Chicago, Rock Island & Pacific at Little Rock, Ark., has been appointed chief engineer of the Chicago, Rock Island & Gulf, with office at Fort Worth, Tex., succeeding K. H. Hanger, whose appointment as trainmaster of the Oklahoma division of the Rock Island lines has

been announced in these columns. Francis Nugent succeeds Mr. Stone. E. Robertson has been appointed road foreman of equipment of the Chicago, Rock Island & Pacific, with headquarters at Pratt, Kan., succeeding C. W. Sheffer, resigned.

The motive power departments of the Cleveland-Indianapolis and the Cincinnati-Sandusky divisions of the Cleveland, Cincinnati, Chicago & St. Louis, and that of the Cincinnati Northern, have been consolidated; and J. T. Luscombe, whose appointment as master mechanic, with office at Bellefontaine, Ohio, was announced in these columns last week, is in charge of the consolidated divisions. F. J. Zerbee, formerly master mechanic at Bellefontaine, has been appointed superintendent in charge of federal and state inspection and safety appliances on locomotives and cars, with headquarters at Indianapolis, Ind.

H. B. Welsh, supervisor of the Pennsylvania Railroad at Titusville, Pa., has been appointed supervisor with office at Brocton, N. Y., succeeding A. C. Gates, assigned to other duties. F. M. Robb, assistant supervisor at Tyrone, Pa., succeeds Mr. Welsh, and N. A. Camera, assistant supervisor at New York, succeeds Mr. Robb. E. K. Post, supervisor of signals at Camden, N. J., has been appointed supervisor of signals at Altoona, Pa., succeeding J. J. Craig, assigned to other duties, and C. S. Foster, supervisor of signals at New York, has been appointed supervisor of signals, with office at Reading, succeeding A. B. Pollock, transferred.

Walter Hunter Erskine, who has been appointed master mechanic of the Minneapolis & St. Louis, with headquarters at Cedar Lake Shops, Minneapolis, Minn., as has been announced in these columns, was born February 3, 1878, at Rushford, Minn. He attended the grade and high schools at St. Paul, Minn., from 1884 to 1895, and began railway work in June of the latter year, with the Chicago, St. Paul, Minneapolis & Omaha. Except for a short period when he was with the Northern Pacific and the Union Pacific, he was with the C. St. P. M. & O. continuously until August, 1910, having been machinist apprentice, machinist and foreman. On August 29, 1910, he became general foreman under the master mechanic of the Minneapolis & St. Louis, was appointed assistant master mechanic on September 2, 1910, and on February 19, 1912, was promoted to master mechanic, as above.

Special Officers.

E. A. Ryder has been appointed commissioner of the new department of fire claims of the Boston & Maine, with office at Boston, Mass., reporting to Vice-President T. E. Byrnes. He will have full authority over all matters pertaining to the prevention of fires and the settlement of fire claims, excepting those arising from damage to merchandise in transit. All adjustments of the company's insurance will be made by W. J. Hobbs, vice-president in charge of the financial and accounting department, as heretofore, with office at Boston, Mass.

OBITUARY.

James Brownlee, superintendent of the Canadian Pacific at Kenora, Ont., died at his home in Kenora recently. Mr. Brownlee was born at Belleville, Ont., and about a year and a half ago he was transferred as superintendent from Moose Jaw, Sask., to the Kenora division at Kenora.

Joshua B. Barnes, formerly superintendent of the locomotive and car department of the Wabash Railroad, with office at Springfield, Ill., died at Springfield on February 21. Mr. Barnes was born December 13, 1840, at Reservoir, Lincolnshire, Eng., and began railway work in 1856. Previous to 1861 he was master mechanic of the Dubuque, Marion & Western, now part of the Chicago, Milwaukee & St. Paul, and from 1861 to 1862 was machinist on the Pittsburgh, Fort Wayne & Chicago. In the latter year Mr. Barnes went with the Wabash, St. Louis & Pacific, and remained with that road and its successor, the Wabash Railroad, until his retirement in 1907. From 1862 to 1882 he was general foreman in the machinery department, was then for three years master mechanic; from 1885 to 1905, superintendent of motive power and machinery, and on July 1, 1905, his jurisdiction was extended over the car department, with the title of superintendent of the locomotive and car department, which title he retained until the time of his retirement several years ago.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Louisiana Railway & Navigation Company is in the market for five locomotives.

The Mobile & Ohio has ordered two mikado locomotives from the Baldwin Locomotive Works.

The Southern Railway has ordered 5 Pacific type locomotives from the Baldwin Locomotive Works.

The Houston & Texas Central, it is said, has ordered 33 locomotives from the company's shops. This item has not been confirmed.

The Denver & Rio Grande is making tentative inquiries for about 35 locomotives, though nothing yet has been definitely decided upon.

The Wabash has ordered 18 mikado locomotives, 6 Pacific type passenger locomotives and 12 six-wheel switching locomotives from the Baldwin Locomotive Works.

The Pittsburgh & Lake Erie has ordered 5 ten-wheel locomotives from the American Locomotive Company. The dimensions of the cylinders will be 22 in. x 26 in., and the diameter of the driving wheels will be 72 in. These locomotives will be equipped with superheaters.

CAR BUILDING.

The Duluth & Iron Range has ordered 10 refrigerator cars from the Peterler Car Company.

The Missouri & North Arkansas has ordered two 70-ft. gas electric cars from the General Electric Company.

The Savannah & Southern has purchased one 60-ft. combination car from the Central Locomotive & Car Works.

Phelps, Dodge & Company, New York, have ordered 100 Rodger ballast cars from the American Car & Foundry Company.

The Pierce-Fordyce Oil Association, Dallas, Tex., has ordered 100 tank cars from the American Car & Foundry Company.

The Western Chemical Company, Denver, Col., is in the market for five oil tank cars of 8,000 gallons' capacity and one flat car.

The New York Central Lines have ordered 500 box cars from the American Car & Foundry Company. These cars are for the Rutland.

The Northern Pacific has ordered 1,000 box cars from the American Car & Foundry Company, and 50 tank cars from the Pressed Steel Car Company.

The Vandalia has ordered 235 box cars from the American Car & Foundry Company, and 50 fifty-ton all-steel gondola cars from the Cambria Steel Company.

The Bessemer & Lake Erie, as mentioned in the *Railway Age Gazette* of March 1 has ordered 100 all-steel box cars from the Standard Steel Car Company. The contract for these cars was awarded to the Summers Steel Car Company, but they will be built by the Standard Steel Car Company. These cars will be of the Summers design throughout, and will be equipped with the Summers balanced side bearing truck.

IRON AND STEEL.

The Lehigh & New England has ordered 2,000 tons of rails from the Bethlehem Steel Company.

The Missouri Pacific has ordered 11,500 tons of open hearth rails from the Illinois Steel Company.

The Hocking Valley has ordered 4,000 tons of open hearth rails from the Cambria Steel Company.

The Chicago, Rock Island & Pacific has ordered 3,000 tons of bridge material from the American Bridge Company.

THE GREAT NORTHERN is reported to have ordered 31,000 tons of rails from the Colorado Fuel & Iron Company, and 20,000 from the Pennsylvania Steel Company.

GENERAL CONDITIONS IN STEEL.—Orders for new business are increasing in volume, especially the orders from railways. It is believed by many that the unfilled tonnage report of the Steel Corporation for February will show an increase over January, though the contrary was until recently expected. The Steel Corporation continues to operate at almost 90 per cent. of its capacity. Prices are showing a tendency to stiffen and everything seems to point toward a marked improvement in the near future.

SIGNALING.

New Installations of Block Signals, Interlocking, Telephones for Train Despatching, Etc.

The El Paso & Southwestern is arranging to install the telephone system of train despatching on its Eastern division.

The plans of the Pennsylvania Railroad for extensive installations of new automatic signals are the subject of an article on a preceding page.

The Chicago & North Western is planning the installation of a telephone train despatching system on the Galena division, between Chicago and Clinton, Iowa, and between Nelson, Ill., and Peoria.

The Grand Trunk Railway of Canada announces that automatic signals are to be installed on its line from Toronto to Niagara Falls, about 80 miles, and also from Hamilton, Ont., to Lyndon Junction, 16 miles. These will be the first extensive installations of automatic signals on the Grand Trunk in Canada.

The Piedmont Traction Company is to install on its line from Charlotte, N. C., to Gastonia, 24 miles, eight train order signals to be controlled from a single central office. The Greenville, Spartanburg & Anderson electric road will make a similar installation on 58 miles of its line, Greenville, S. C., to Greenwood, with 11 stations. On both of these railways the installation will include a telephone line, with selectors, all the apparatus being furnished by the Western Electric Company.

The Atchison, Topeka & Santa Fe in the near future will install automatic block signals between Needles and Goffs, Cal., 32 miles, double track. On this district the ruling grade westward is 1½ per cent. The eastward signals will be three-position, and the westward two-position, giving caution and proceed indications only. The blocks will be two miles long, except at Goffs and approaching Needles, where the sections will average about one mile long. The two-position up-hill signals will have full block overlaps. Power for the control and operation of the entire installation, and also for the lights at stations, will be obtained from the signal department's 4,400-volt transmission line. The generators furnishing this power will be located in the company's power plant at Needles.

FOREIGN RAILWAY NOTES.

A concession has been granted for the construction and operation of a railway from Mar del Plata, in the province of Buenos Aires, Argentina, to Antuno, Chile, or a point opposite Los Angeles. The railway will have a branch to Bahia Blanca, Argentina.

The railway across the Andes from Arica, Chile, to La Paz, Bolivia, was completed on March 3, when the rail ends near the Chile-Bolivia frontier were jointed. The line, which is 270 miles long, attains in places an elevation of about 1,400 ft. The contract price was $13,750,000. The work has taken less than three years, despite the difficulties presented by the nature of the country which the line traverses. In the first fifty or sixty miles the railway crosses a desert, then it crosses the Andes, while the last 200 miles or so are over high tableland. Many short tunnels had to be constructed. The line gives Bolivia a much shorter route to the Pacific coast. It was constructed for the Chilean and Bolivian governments in accordance with treaties signed in 1904.

Supply Trade News.

The Remy Electric Company, Anderson, Ind., has received an order from the Canadian Pacific for 12 American locomotive electric headlights.

Norman Malcom has been made manager and chief engineer of the railway and waterproofing department of the Standard Asphalt & Rubber Company, Chicago.

T. R. Wyles, second vice-president of the Detroit Graphite Company, Chicago, was elected a director of the company at its recent annual meeting. Mr. Wyles has been connected with the Detroit Graphite Company since 1897, when he entered its employ as agent, and has been second vice-president since 1907. He was born in Prince Edward county, Ontario, January 14, 1872, and attended an English public school from 1879 to 1888. Until the fall of 1890 he was employed in various capacities in the coal business and tobacco business at Richmond, Va., and during the next year was private secretary to the president of the Lambert Pharmacy Company at St. Louis, Mo. From 1891 to 1896 he was a stenographer in the purchasing department of the American Refrigerator Transit Company at St. Louis, and from 1896 to 1897, contracting freight agent of the company at Chicago, which position he left to become connected with the Detroit Graphite Company.

T. R. Wyles.

The Jno. F. Stevens Construction Company, 55 Wall street, New York, has been incorporated to execute by contract, or supervise, the construction of railways, canals, river and harbor improvements, irrigation projects, water power developments, etc., in any part of the world It will make a specialty of expert engineering, covering examinations and reports upon proposed or existing properties, not only as to physical conditions and values, but also as to methods and economies of maintenance, operation and general policies.

John F. Stevens.

The president of the company is John F. Stevens, who resigned last spring from the presidency of the Spokane, Portland & Seattle and other Hill lines in Oregon and Washington. Mr. Stevens was born on April 25, 1853, at West Gardiner, Me. He became assistant engineer of the city of Minneapolis, Minn., in 1874, and remained in that position until he began railway work in 1876 in charge of surveys on the Sabine Pass & Northwestern, of which he was later made chief engineer. He was appointed assistant engineer of the Denver & Rio Grande in 1879, and the following year went to the Chicago, Milwaukee & St. Paul as assistant engineer. From 1882 to 1886 he was division engineer on the Canadian Pacific, leaving that position in

1886 to return to the Chicago, Milwaukee & St. Paul as assistant engineer. The following year he was made principal assistant engineer of the Duluth, South Shore & Atlantic, and in 1889 was appointed assistant engineer of the Spokane Falls & Northern. He resigned in 1890 to go to the Great Northern as principal assistant engineer, becoming assistant chief engineer in 1893 and chief engineer in 1895. In June, 1898, he resigned to go into business as a contractor. The following April he was appointed chief engineer of the Great Northern, becoming also the general manager in June, 1902. He was appointed chief engineer of the Chicago, Rock Island & Pacific in March, 1903, and the following August was elected the fourth vice-president, becoming the second vice-president in April, 1904. He was appointed chief engineer of the Isthmian Canal Commission in July, 1905, and in August, 1907, was elected vice-president in charge of transportation of the New York, New Haven & Hartford. In June, 1909, he became president of the Oregon Trunk, being later made also president of the Spokane, Portland & Seattle and allied companies.

The American Agencies, Ltd., Los Angeles, Cal., acting as Pacific coast agent for eastern manufacturers, is making arrangements to open offices in San Francisco, Cal., Portland, Ore., and Seattle, Wash.

Chester Jones, who has been connected with the signal accessory department of the General Electric Company, Schenectady, N. Y., since 1910, has been transferred to the Chicago office of that company, where he will continue to specialize in the sale of signal accessories, being associated with A. I. Totten.

Permanent Exhibition of Railway Supplies.

Extensive preparations are being made for the formal opening of the Permanent Manufacturers' Exhibition of Railway Supplies in the Karpen building, Chicago, during the week of March 16-23. Over 30,000 invitations have been mailed to railway officials, together with tickets of admission and a handsome prospectus which includes half-tone reproductions of photographs of some of the principal exhibits, aisles, assembly and committee rooms, together with a description of the exhibition and its purposes. Plans are being made for a program of entertainment throughout the week, and the club and grill room will be opened for the first time. The Western Railway Club will hold its monthly meeting in the assembly room on March 19, and efforts are being made to make the exhibit room headquarters for railway and supply men during the week.

Annual Report of the American Steel Foundries.

The annual report of the American Steel Foundries issued this week covers the period of 17 months from August 1, 1910, to December 31, 1911, on account of a change in the company's fiscal year to correspond with the calendar year, in accordance with the government's annual report requirements. The gross sales for 17 months were $14,300,562, or at the rate of $10,094,514 per year, as compared with $17,173,740 for the preceding year. Earnings from the operations of plants and net income of subsidiary companies were $697,610, and the total income $757,103. After deductions of $1,016,134, including interest on borrowed money, on debentures and on bonds, bond sinking fund installment and profits amounting to $157,066.84, and depreciation of buildings, plant and equipment amounting to $332,636.20, the report shows a net loss balance of $259,030.92. President William V. Kelley, who has since been elected chairman, shows, however, in his report, that after ordinary deductions and provisions, the actual net earnings of the company were $85,452.42, but from these there has been deducted and converted into the bond sinking fund $240,980, and also a sum of $103,502, to bring the inventory of raw materials down to the low market prices obtaining on December 31. The property account during the period increased $234,831. The following observations on the business conditions of the year were made by President Kelley in his report:

"To those familiar with general business conditions during the past few years and particularly with those pertaining to railway affairs, no comment on the result of our operations is necessary. By far the largest portion of the business of this company originates from the building of railway cars and locomotives; therefore its operations and output closely follow activity in those lines. During the period under report accepted authorities give the ratio of car building as less than 60 per cent. of those built during our preceding year, and only one-third of those during the calendar year 1907. The result of the lack of buying by railways and generally depressed business conditions, both due to conditions with which the public is familiar, was that the steel casting plants of this company were only able to operate an average of 50 per cent. of their capacity during the entire period of 17 months and during six of the months at 40 per cent. or less, one month dropping to 32 per cent.; while the Hammond Works, which is devoted entirely to railway material and usually one of our best earners, was only able to run at 30 per cent. of its capacity during the entire time, and during four of the months below 20 per cent., and for one month at only 12 per cent. At times there was only a week or ten days' work ahead for any of the works which, in a business of this character, means that operations were practically at a standstill. Orders on hand are larger than at any time since the beginning of the period covered by this report, but prices, like those in other lines of steel manufacture, are unsatisfactory. It is hoped, however, that a liberal buying movement will both improve prices and increase our output."

TRADE PUBLICATIONS.

CYLINDER PACKING.—The Detroit Leather Specialty Company, Inc., Detroit, Mich., has issued a folder entitled Efficiency, describing the company's Wear Well Air Cylinder Packing.

TURBINE PUMPS.—The Lea Equipment Company, Philadelphia, Pa., has published bulletin K on the Lea high-duty turbine pumps. The bulletin is illustrated and gives a detailed description of the construction of these pumps.

RAIL JOINTS.—The Humason Rail Joint Company, Shreveport, La., has published a small booklet illustrating and concisely describing its rail end supported rail joints. Illustrations show both these and other joints in service. The booklet includes some interesting results of tests.

NORTHERN PACIFIC.—The passenger department of this company has published a small illustrated folder on the North Coast Limited, which tells of the equipment of this train, shows the times of arriving at the different stations and includes some interesting facts on the points along the route.

The Russian city of Odessa, on the Black Sea, has only one railway leading into it. Furthermore, while this line, which comes from the Northwest in the direction of Austria-Hungary and Germany, is favorably situated for outbound passenger traffic, it is at a disadvantage for bulky freight for export. This is one reason why in late years, since the improvement of the ports of Nicolaief and Kherson, also on the Black Sea, which offer shorter connection in the direction leading toward the center of Russia, trade has been greatly diverted from Odessa toward those two places. In the interests of Odessa, and to remedy matters, there is being built the new railway from Odessa to Bakhmach, which will greatly reduce the distance between Odessa and Moscow. Construction of this road is being actively pushed and it will soon be open for traffic. This road, however, will pass over the navigable River Bug at the town of Woznesensk, which already has much shipping, shallow-draft barges being employed to carry cargoes down to Nicolaief. Exporters at Nicolaief are already planning to tap the Odessa-Bakhmach railway at Woznesensk with the intention of intercepting cargo which the road may bring down from the interior, so that the new line is not likely to benefit Odessa greatly unless artificial impediments are thrown in the way of the Nicolaief tapping at Woznesensk. The merchants of Kherson have set about to obtain a road to connect their town with the interior of Russia by a road to Kharkof, the intention being to have it run parallel with the Odessa-Bakhmach road and not too far off, so that it will offer still greater advantages. It is now stated that the committee on construction of new railways has decided in favor of a road from Kherson via Merefa to connect with Kharkof. The length will be about 521 miles, to cost approximately, $23,175,000. This will go far toward enabling Kherson to outdistance both Odessa and Nicolaief.

Railway Construction.

New Incorporations, Surveys, Etc.

ALABAMA GREAT SOUTHERN.—An officer writes, regarding the reports that considerable double tracking work is to be carried out this year, that while this work is contemplated, none of it has yet been authorized. C. Dougherty, chief engineer, Cincinnati, Ohio.

BIRMINGHAM & CHATTANOOGA.—An officer writes that surveys are now being made for a line from Birmingham, Ala., northeast via Boaz to Chattanooga, Tenn., about 140 miles. The survey work is about half finished. It has not yet been decided when this will be asked for the work. There will be one steel bridge and six trestles on the line. The company expects to develop a traffic in agricultural products, coal, iron and timber. J. M. Spradlin, president and treasurer, Boaz; W. W. Shortridge, vice-president and secretary, Boaz, and P. S. Milner, locating engineer, Birmingham.

BRITISH COLUMBIA ELECTRIC.—The Vancouver, Fraser Valley & Southern has applied to the Canadian parliament for an extension of time for the construction of the following lines: From New Westminster, B. C., to Douglas, on the international boundary; from the New Westminster bridge in an easterly direction up the Fraser valley to Chilliwack, and from a point south of the Fraser river, westerly to Ladners Landing in the municipality of Delta. A. T. Goward, manager, Victoria, B. C.

CAMBRIA & CLEARFIELD.—See Pennsylvania Railroad.

CANADIAN NORTHERN.—This company has asked the British Columbia government for a subsidy of $12,000 a mile for 520 miles from the summit of the Rocky mountains to Vancouver, B. C. It is expected that the work will be finished in about two years. T. Turnbull, assistant chief engineer, Winnipeg, Man.

The Battle River subdivision has been extended from Stettler, Alta., to Drumeller, 68½ miles; the Brandon, Maryfield-Lampman section has been extended from Radville, Sask., to Antar, 80½ miles, also from Radville to Bengough, 45 miles. T. Turnbull, assistant chief engineer, Winnipeg, Man.

CANADIAN PACIFIC.—According to press reports, contracts have recently been given by this company to build 308 miles of line. Most of the work will be in the province of Saskatchewan.

A grading contract has been given to J. G. Hargrave & Company, Winnipeg, Man., for work from Suffield, Alta., to a point 30 miles southwesterly. The work will involve the handling of about 700,000 cu. yds. of earth. The contractors will sub-let some of the grading, and the work will be started as soon as weather conditions will permit. The same contractors are completing work on the Canadian Pacific from Rassano northerly.

The Lacombe & Castor branch of the Alberta division has been extended from Castor, Alta., east to Coronation, 22 miles. J. G. Sullivan, chief engineer, western lines, Winnipeg, Man.

CENTRAL OF CANADA.—A preliminary survey has been made between Montreal, Que., and Midland, Ont., also for a branch from St. Andrews, Que., to Ste. Agathe. The final surveys for the line from Montreal, through St. Eustache, St. Placide, Oka, St. Andrews, Hawkesbury, McAlpin and Lemieux, to South Indian, have been completed, and a considerable portion of the right of way, with land for terminal purposes at Montreal, has been secured. Construction work has been commenced on the bridges over the River des Prairies and River des Mille Iles, near Montreal, at St. Eustache, and over the Ottawa river at St. Andrews. Orders have been placed for rails and for ties to be laid on about 50 miles. C. N. Armstrong, managing director, and F. S. Williamson, chief engineer, Montreal. The contractors are C. J. Wills & Sonss of London England, who have an office in Montreal. (February 16, p. 320.)

CHARLOTTE HARBOR & NORTHERN.—An officer writes that work is now under way relaying two miles of track near Pierce, Fla., with 70-lb. rail. C. P. Murdock and Lloyd Carlton are the contractors. G. S. Bruce, chief engineer, Boca Grande, Fla.

CHICAGO & NORTH WESTERN.—This company is receiving bids for the construction of a new line from Peoria, Ill., to Girard, where it will connect with the Macoupin County Railway, a North Western line reaching the coal mines of that road south of Girard. The new line will require the construction of a bridge across the Illinois river near Pekin, and of a large terminal yard at that point. The grading will be heavy, as crossings with other lines will be separated. E. C. Carter, chief engineer, Chicago.

CHICAGO, OTTAWA & PEORIA.—This road has been extended from Morris, Ill., east to Joliet, 22 miles. W. B. McKinley, president, Champaign, Ill.

COVINGTON, BIG BONE & CARROLLTON.—Rights of way are now being secured to build from Carrollton, Ky., northeast via Big Bone Springs to Covington, about 52 miles. The incorporators include N. J. Crouch, president, Union; L. Fritz, vice-president; R. S. Holmes, treasurer, and J. J. Weaver, engineer, all of Covington. G. W. Anderson, Carrollton, Ky., is interested. It has not yet been decided whether steam or electricity will be used for the motive power.

DOMINION ATLANTIC.—The company has applied to the Canadian parliament for an extension of time to build from a point between Kentville, N. S., and Canning, westerly to a point on the line between Berwick and Middleton. P. Gifkins, general manager, Kentville.

EUFAULA & CHATTAHOOCHEE VALLEY.—An officer is quoted as saying that the company will let contracts in the near future to build the first section from Pittsview, Ala., to Eufaula, 21 miles, and that work will probably be carried out soon on additional sections between a point in Russell county and a point in Henry county. J. P. Foy, president; A. H. Merrill, vice-president, and W. L. Wild, secretary and treasurer, Eufaula. (September 29, p. 615.)

GREAT NORTHERN.—An officer is quoted as saying that the company is relaying and ballasting about 400 miles of track, all of this work is to be carried out this year.

Bids are now being asked for by the Great Northern for grading 60 miles of new line from Wenatchee, Wash., northeast to Pateros. When completed this line is to be 135 miles long, extending from Oroville south to Wenatchee. Grading has been finished from Oroville to Pateros.

Work is now under way on the line from Bluestem, northwest to Peach, about 25 miles. A. H. Hogeland, chief engineer, St. Paul, Minn. (December 22, p. 1300.)

HUDSON BAY RAILWAY.—J. D. McArthur, Winnipeg, Man., who has the contract for the first section of 185 miles from LePas, Keewatin, northeast, says that as soon as the frost is out of the ground 1,000 will be put to work on the line. It is expected that the work on this section will be finished within one year. (February 23, p. 360.)

KETTLE VALLEY.—This road is to be extended from Coldwater Junction, B. C., to Hope, 50 miles, thence to Coquahala river. The Vancouver, Victoria & Eastern is to have trackage rights over the road. The company has been granted a subsidy of $10,000 a mile by the British Columbia government, and a $200,000 bridge is to be built by the province of British Columbia over the Fraser river at Hope. A. McCulloch, chief engineer, Penticton, B. C.

LAC SEUL, RAT PORTAGE & KEEWATIN.—This company has applied for an extension of time to the Ontario legislature for the construction of the following lines: From a point at or near Lac Seul, Ont., in the Rainy River district, and from Kenora, northwesterly or northerly, to a crossing of the National Transcontinental; from a point at or west of the junction of the National Transcontinental with the Lake Superior branch of the Grand Trunk Pacific to Lac Seul, and from or near the same point to the northern boundary of Ontario at or near Separation lake. J. F. McGillivray, Kenora, Ont., is acting solicitor of the company.

LOUISIANA ROADS.—Plans are being made to build a railway from Monroe, La., northeast to Boeuf river, about 30 miles. Colonel E. W. Anderson, secretary, Progressive League, Monroe; J. S. Watson and L. J. Hale, Memphis, Tenn., are interested.

LOUISVILLE & NASHVILLE.—An officer writes that contracts for grade reduction and double-track work in Tennessee and Alabama have been let as follows: To Denvonshire & Max-

field, Pointdexter, Ky., or Miamisburg, Ohio, 3 miles, Maplewood, Tenn., to Cumberland river at Nashville, Tenn.; Walton-McDowell Company, Brentwood, Tenn., 19 miles, from Cumberland river at Nashville to Clovercroft, Tenn.; T. Towles & Co., Wise, Va., 25 miles, Clovercroft to Duck river; W. J. Sparks Company, Lewisburg, Tenn., 11 miles, from Duck river to Lewisburg, Tenn.; Leighton-Ambrose Construction Company, Knoxville, Tenn., 8½ miles, Lewisburg to Richland creek; S. Walton & Co., Falls Mills, Va., 4½ miles, Richland creek south; Callahan Construction Company, Knoxville, Tenn., 15 miles, from Richland creek to Elk river; A. & C. Wright, Ballston, Va., 9 miles, Elk river to 1½ miles south of Tennessee-Alabama state line; Ryan Construction Company, Portsmouth, Ohio, 13 miles, from 1½ miles south of Alabama-Tennessee state line to Athens, Ala.; Williams Bros. Construction Company, Roanoke, Va., 4⅔ miles of work, Flint to Hartselle, Ala.; C. G. Kershaw Contracting Company, Birmingham, Ala., 6 miles, Hartselle to Leesdale, Ala.; T. J. Vermillion, Barbourville, Ky., 2 miles, Lacon to Wilhite, Ala.; E. K. Langhorne & Co., Visalis, Ky., 1½ miles, Vinemont to Holmes Gap; J. C. Carland & Co., Toledo, Ohio, 18 miles, Holmes Gap to Garden City; Adams & Sullivan, Louisville, Ky., 5 miles, Garden City to south of Bangor, Ala.; Thrasher & Gunter, Knoxville, Tenn., 9 miles, from north of Blount Springs to Locust Fork river; Callahan Construction Company, Knoxville, Tenn., 6 miles, Locust Fork to Self creek, and Asheville Construction Company, Knoxville, Tenn., 10 miles of work, Self creek to New Castle, Ala.

Mexican Roads.—Announcement has been made by A. D. Meloy, who is interested in mines in the Guanacevi districct, in the state of Durango, Mex., that he has completed financial arrangements to build a railway from that place to Tepehuanes, where connection is to be made with the National Railways of Mexico.

The line from San Augustin, Mex., to Irolo has been extended south to San Lorenzo, 6 miles. James M. Reid, chief engineer, Mexico, Mex.

Muscatine North & South.—This road has been extended from Kingston, Iowa, south to Burlington, 13 miles. Charles Howard, president and general manager, Muscatine, Iowa.

New York Connecting.—See Pennsylvania Railroad.

Northern Pacific.—This company will shortly begin elevating the tracks through Spokane, Wash. The work will necessitate the reconstruction of about two miles of railway. Double track is to be laid on an earthen embankment, which is to be constructed with space enough for four tracks. In addition to the track elevation, a rearrangement of the company's shops and roundhouses on the outskirts of the city will be made. The total cost of the improvements will probably be between $3,000,000 and $4,000,000. W. L. Darling, chief engineer, St. Paul, Minn.

Ottawa & Lake McGregor.—Incorporation has been asked for in Canada to build from Ottawa, Ont., to Hull, Que., thence to Gatineau Point, Perkin's Mills and Lake McGregor. It has not yet been decided whether steam, or electricity, will be used for the motive power. J. A. Ritchie is solicitor for the applicant.

Pennsylvania Railroad.—The report of this company for the year ended December 31, 1911, shows that during the year right of way was secured for small branch lines in the bituminous coal regions of Pennsylvania. The new four track elevated line and passenger station at Bristol, Pa., have been completed and are now in operation, and all main line grade crossings at that city have been eliminated. The Newark Rapid Transit line from the Hudson terminal, New York, via the Manhattan Transfer station to Park Place, Newark, N. J., has been finished, and is now in operation. The construction of the eastern section of the six track system between Morrisville, Pa., and Newark, N. J., has been started by beginning the construction of two additional tracks adjoining the present four track main line from Colonia to Bay Way west of Elizabeth. This work includes elevating the existing main line tracks through Rahway. The extension of the six track system through Elizabeth to Waverly, including line and station improvements, will be carried out when the necessary municipal authority has been secured. Expenditures have been made by the Philadelphia, Baltimore & Washington for the extension of the four track system at various points, and the construction of a car load delivery yard at New Jersey avenue, Washington, D. C. On the Cambria & Clearfield, work on the Bear Run branch has been started and will be finished in 1912, the Burley branch was completed during the year. The work of improving the grade and alinement on the Western New York & Pennsylvania was continued during the year. The New York Connecting Railroad, which is owned jointly by the Pennsylvania Railroad and the New York, New Haven & Hartford, is building from a connection with the Long Island Railroad near the boundary line between the boroughs of Brooklyn and Queens, New York City, through Queens borough, to and over the East river and Randall's and Wards islands, to a connection with the New York, New Haven & Hartford near Port Morris in the borough of the Bronx, and also a connection from the main line to the New York tunnel extension in Sunnyside yard, Long Island City. Contracts have been let for the steel work for the East river bridge, and the viaducts and approaches on the north into Bronx borough, and on the south into the borough of Queens. About three years will be required to build the line, including the East River bridge and viaducts. The estimated cost of the work is $15,000,000 in addition to the $5,000,000 previously advanced.

Philadelphia, Baltimore & Washington.—See Pennsylvania Railroad.

Porcupine-Rand Belt (Electric).—Application has been made in the province of Ontario for a charter to build from McGarry in Lanark county, to Larder City, Hearst, McElroy, Boston, Otto, Grenfell, Robertson, Argyle, Gerkie, Musgrove and Doyle. The headquarters of the company are at Porcupine.

San Antonio & Aransas Pass.—This company is said to have given an order for rails to be laid on an extension of about 50 miles from Falfurrias, Tex., south to Edinburg. It is understood that the line will eventually be extended an additional 65 miles southeast to Brownsville. L. Andrews, assistant engineer, Yoakum, Tex.

Southern Alberta.—Application has been made to the Alberta legislature for an extension of time to build from the Canadian Pacific at Medicine Hat, Alta., northwesterly to a point on the Bow river in township 11, range 13, west of the fourth meridian, thence westerly to the Calgary & Edmonton Railway, and from that line in township 24, range 1, west of the fifth meridian, northwesterly to a point in township 24, range 1, west of the fifth meridian. White & Laidlaw, Lethbridge, Alta., are solicitors for the company.

Southern New England.—In the hearing before the Massachusetts legislative committee, held in Boston last week, President Fitzhugh, speaking for this road, and answering questions as to the routes by which the company proposes to approach Boston from the southwest and from the northwest, said that the company had in mind the construction of a belt line around Boston, for the purpose of securing desired connections with other railways and with the docks.

Southern Pacific of Mexico.—The Sinaloa division has been extended from Yago, Mex., south to Tepic, 52 miles. E. Randolph, president and general manager, Tucson, Ariz.

Texas Southeastern.—This road has been extended from Neff, Tex., to New Camp, 3 miles. J. E. Mitchell, vice-president and chief engineer, Diboll, Tex.

Toronto Suburban.—Announcement has been made that this company will finish work this coming fall on an electric line from Toronto, Ont., west via Cooksville, Acton, and Eden Mills, to Guelph. It is intended to eventually extend the line from Guelph to Galt and to Berlin. The headquarters of the company are at Toronto.

Vancouver, Fraser Valley & Southern.—See British Columbia Electric.

Waycross & Western.—An officer writes that work is under way from Waycross, Ga., west via Sirmans and Milltown to Rays Mill, 51 miles. The track has been laid on 13 miles. The company is carrying out the work with its own men. A. K. Sessoms, president, Waycross.

Western New York & Pennsylvania.—See Pennsylvania Railroad.

RAILWAY STRUCTURES.

AUGUSTA, ME.—The Maine Central has asked architects to submit designs for the new passenger station to be built at Augusta.

It is reported that the Maine Central will put up a double-track bridge over the Kennebec river at Augusta, to replace the present single-track structure.

FAIRMONT, W. VA.—An officer of the Baltimore & Ohio writes that the company is planning to build a new freight terminal at Fairmont, W. Va.

GODERICH, ONT.—The Canadian Pacific is planning to make improvements at Goderich, Ont., to include new sidings, a 500-ft. shed on the pier, and an electric light and heating plant.

HARRISONBURG, VA.—Bids are wanted until March 20, by C. B. Williams, superintendent of the Chesapeake Western, Harrisonburg, for putting up a combined freight and passenger station at Bruce street, Harrisonburg. The building is to be two stories high, of brick construction with slate roof, 60 ft. x 140 ft., and will cost $12,000.

HOPE, B. C.—See Kettle Valley under Railway Construction.

MONTREAL, QUE.—Bids are wanted by W. B. Powell, vice-president and general manager, Montreal, of the Montreal & Southern Counties, for building a sub-station two stories high, 60 ft. x 85 ft. The building is to be of steel frame construction, with concrete and brick walls. Bids are also asked for a building to contain car barns, offices, etc., two stories high, 85 ft. x 205 ft., to be constructed of brick, concrete and steel, with a four-track shed.

NORRISTOWN, PA.—The report of the Pennsylvania Railroad for the year ended December 31, 1911, shows that additional property was secured during the year for the enlargement and improvement of the freight station facilities at Norristown, at Lancaster, at Harrisburg and at Uniontown, also for the abolition of grade crossings at various places. Grade crossings at Coatesville, at Christiana, at Jeannette, at Trafford and at Lambert street, Pittsburgh, have been abolished by the construction of undergrade bridges. A new freight and transfer station was built at Harrisburg, the new passenger station at Bristol was completed, and considerable extensions were made to various car shops during the year. The improvements at Greensburg, including a new passenger station and the revision of grade and completion of the four-track system were finished during the year. A change of grade, and extension of the track facilities in West Brownsville yard to reach the elevation of the new double-track Monongahela river bridge at that place, were begun during the year, and contracts have been let for the construction of the bridge to replace the present single-track structure. The Northumberland classification yard was completed during the year, and is now in operation. Work has been started on the construction of a 16-span, double-track steel bridge over the west branch of the Susquehanna river at Montgomery to replace the present single-track structure. The company has concluded that improvements to the passenger facilities in Philadelphia should be accomplished by increasing the tracks and platforms, and enlarging the station facilities at Broad street station and at North Philadelphia station. On the Northern Central, a new passenger station was built in Baltimore, Md., and the facilities increased and a rearrangement of the tracks were made. A roundhouse was put up at Orangeville. On the Delaware Railroad a new station was built at Dover, Del., and the second track extended from Broad Creek to Laurel.

PEKIN, ILL.—See Chicago & North Western under Railway Construction.

ROANOKE, VA.—An officer of the Norfolk & Western writes that plans have not yet been finished for additions to be made to the erecting shop at Roanoke, Va., and for the installation of traveling cranes. These improvements will probably be carried out during the coming summer.

SAN ANTONIO, TEX.—An officer writes that the Missouri, Kansas & Texas has bought property for a freight terminal, and is preparing to build yards, a roundhouse, shops and freight house, but it has not yet been determined whether the improvements will be made this year.

Railway Financial News.

ATCHISON, TOPEKA & SANTA FE.—The $9,394,000 California-Arizona lines first and refunding mortgage 4½ per cent. bonds of March 1, 1912-1962, which were offered by J. P. Morgan & Co., the First National Bank and the National City Bank, all of New York, were subscribed for, it is understood, to the extent of about 75 per cent. within the first 24 hours of offer. The £1,830,000 ($9,150,000), however, offered in London were only subscribed for, a press despatch from London says, to the extent of a small per cent., the remainder of the bonds being taken by the syndicate which underwrote them.

CANADIAN PACIFIC.—A bill has been approved by the railway committee of the provincial legislature of Canada for the leasing by the Canadian Pacific of the Quebec Central for 999 years, with a guarantee of 4 per cent. dividends on the Quebec Central stock and a guarantee of the fixed charges of the Quebec Central.

CINCINNATI NORTHERN.—A dividend of 1½ per cent. has been declared on the $3,000,000 stock. This compares with 3 per cent. declared in 1911 and 3 per cent. declared in 1910. The C. C. C. & St. L. owns $1,707,400 of Cincinnati Northern stock.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—See Cincinnati Northern.

DAYTON, LEBANON & CINCINNATI.—*The Commercial & Financial Chronicle* has been informed by a vice-president of the Pennsylvania Lines West that there is no truth in the report that control of this company had been bought by Pennsylvania interests.

DETROIT, TOLEDO & IRONTON.—The Ohio Public Service Commission has asked the attorney general of Ohio to "wind up the affairs" of the Detroit, Toledo & Ironton, because it is claimed that the service rendered to the public is "deplorable." The road is now in the hands of federal receivers.

GEORGIA & FLORIDA.—Stockholders are to vote on March 19 on the question of authorizing an issue of $2,000,000 6 per cent. general mortgage bonds of February 1, 1912-1932. For the first ten years 5 per cent. interest is dependent on income, but is cumulative, and after ten years the interest charge becomes fixed. The bonds were underwritten by a syndicate headed by Middendorf, Williams & Company, Baltimore, at 52, less a commission of 1¼ per cent. The proceeds of the bonds are to be used to redeem equipment obligations, pay floating debt and provide working capital.

GRAND TRUNK PACIFIC.—This company, through the Pacific Great Eastern, has bought the property of the Howe Sound & Northern for about $375,000.

HOWE SOUND & NORTHERN.—See Grand Trunk Pacific.

MISSOURI PACIFIC.—The Nebraska railway commission has authorized the company to issue $2,415,000 of a newly authorized issue of $6,415,000 equipment refunding bonds.

NORFOLK SOUTHERN.—W. H. Williams, vice-president of the Delaware & Hudson, has been elected a director of the Norfolk Southern, but it is said he represents other interests than the D. & H. (which has no interest in the Norfolk Southern).

PERE MARQUETTE.—Newman Erb, who, it is understood, recently bought control of the Pere Marquette, after returning from a ten-day inspection trip, said that the trip had convinced him that the statement which he gave out (*R. A. G.*, March 1, page 410) in regard to the prospects of the road was correct and that the difficulties of the road were due to certain operating conditions which could be remedied.

PITTSBURGH & LAKE ERIE.—This company has declared an extra dividend of 12 per cent., payable March 29. Stockholders are offered the right to subscribe to 19 per cent. of their holdings to new stock at par. This issue will amount to $4,788,000. This stock is part of the increase from $10,000,000 to $30,000,000, authorized by the stockholders in February, 1907, and will about bring out the full amount of stock authorized.

QUEBEC CENTRAL.—See Canadian Pacific.

ANNUAL REPORT

PENNSYLVANIA RAILROAD COMPANY.

THE PENNSYLVANIA RAILROAD COMPANY.

General Office, Broad Street Station, Philadelphia, March 1st, 1912.

The Board of Directors submit herewith to the Stockholders of The Pennsylvania Railroad Company a synopsis of their Annual Report for the year 1911:—

Operating revenues, rail lines directly operated		$157,487,412.70
Operating expenses, rail lines directly operated		113,228,393.03
Net operating revenue		$44,259,019.67
Outside operations, Deficit		1,525,201.96
Total net revenue		$42,733,817.71
Taxes		6,826,069.53
Operating income		$35,907,748.18
Rentals paid (roads operated on basis of net revenue)		1,517,111.48
Net operating income of The Pennsylvania Railroad Company		$34,390.636.70
Other income:		
Dividends and interest on securities owned	$14,450,593.95	
Hire of equipment, interest General Account, and other items	2,775,880.10	17,226,474.05
Gross income		$51,617,110.75
Fixed charges		14,298,759.70
Net income		$37,318,351.05
From this Net Income amounts have been deducted for the following:—		
Appropriation to the Trust of October, 1878	$319,756.11	
Portion of principal of Equipment Trusts	3,076,853.00	
Amount expended in revision of grades and alignment, etc	2,265,887.29	
Cash dividends, aggregating 6 per cent	25,950,857.25	
Reserve for Additions and Betterments	4,000,000.00	$35,613.353.65
Balance transferred to credit of Profit and Loss		$1,704,997.40

CONDENSED GENERAL BALANCE SHEET.

December 31st, 1911.

Assets.		
Property investment:		
Road	$267,031,115.98	
Equipment	136,392,437.73	$403,423,553.71
Securities owned		321,540,716.02
Securities under lease of U. N. J. R. R. & C. Co		2,559,660.25
Miscellaneous investments		1,045,308.02
Cash		51,076,339.53
Materials and supplies		14,650,140.02
Cash and securities in sinking, insurance and other reserve funds		32,884,354.19
Cash and securities in Provident Funds		6,229,466.33
Other assets		36,233,528.71
		$869,643,066.78
Liabilities.		
Capital Stock	$453,877,850.00	
Convertible bonds receipts exchangeable for stock	2,710.00	$453,880,560.00
Premium realized on Capital Stock from January 1st, 1909		7,050,175.00
Funded Debt of The Pennsylvania Railroad Company	$162,930,370.00	
Funded Debt of Companies whose properties have been acquired by The Pennsylvania Railroad Company	54,546,500.00	
Guaranteed Stock Trust Certificates, Philadelphia, Wilmington and Baltimore Railroad and New York, Philadelphia and Norfolk Railroad Companies	14,822,250.00	
Equipment Trust Obligations	26,757,827.78	
Mortgages and Ground Rents Payable	3,791,060.69	262,848,008.47
Securities received with the lease of the U. N. J. R. R. & C. Co		2,559,660.25
Liability on account of Provident Funds		6,229,466.33
Other Liabilities		35,103,889.99
Additions to property since June 30th, 1907, through income		33,988,133.01
Reserves from Income or Surplus:		
Invested in Sinking, Redemption and other reserve funds	$33,847,775.42	
Car Trust Principal charged out in advance, and reserve for Additions and Betterments	6,737,590.15	40,585,365.57
Profit and Loss		27,397,808.16
		$869,643,066.78

The number of tons of freight moved on the five general divisions east of Pittsburgh and Erie in 1911 was 125,175,068, a decrease of 4,683,285, or 3.61 per cent.; the number of passengers was 67,445,714, a decrease of 2,533,743, or 3.62 per cent.

The Railroad Companies east of Pittsburgh and Erie in which your Company is interested show satisfactory results. Detailed statements of their operations will be found in their respective annual reports, as well as in the full report of your Company.

The number of tons of freight moved on the lines west of Pittsburgh was 138,743,881, a decrease of 14,997,240. The number of passengers carried was 34,392,215, an increase of 399,781.

The operating revenue of all lines east and west of Pittsburgh for the year 1911 was $336,351,868.56, operating expenses, $261,210,277.67, and operating income, $75,141,590.89, a decrease in operating revenue, compared with 1910, of $9,863,630.41, and a decrease in operating income of $3,650,990.86. There were 413,184,812 tons of freight moved on the entire system, being a decrease of 28,030,405 tons, and 168,725,921 passengers carried, an increase of 680,046.

There were expended during the past year for construction, equipment, and real estate on the Lines West of Pittsburgh $12,350,447.84, of which $8,801,922.97 were charged to Capital and $3,548,524.87 to Surplus Income.

The expenditures were principally for new ore docks at Cleveland, and the elevation of tracks in Fort Wayne, construction of new yards at Moravia, and additional main tracks on the Pittsburgh, Youngstown and Ashtabula Railway, second track on the Pittsburgh, Cincinnati, Chicago and St. Louis Railway and Vandalia Railroad.

GENERAL REMARKS.

It will be noted in the General Income Account that while the revenue from passenger transportation shows an increase of $838,159.53 over 1910, it being the largest in the Company's history, the gross revenues of the railroad lines for the year show a reduction of $2,969,885.76, due principally to a decrease in merchandise freight revenue and a small decrease in coal and coke revenue. The decrease in gross revenues was partially offset by a saving of $1,584,235.19, or 1.38 per cent., in operating expenses so that the decrease in the net operating revenue for the year, compared with 1910, was $1,385,650.57. The transportation expenses increased chiefly because the increased wage schedules were operative the entire year, as against only for about eight months in 1910.

Taxes, which have been continually increasing in the last few years, show a further increase for the year of $451,333.77, due principally to the taxes paid on the completed New York Tunnel Extension.

In rentals paid roads operated on the basis of net revenue, the decrease is due principally to the absorption by the Pennsylvania Railroad Company of the Allegheny Valley Railway on April 7th, 1910, when the payment of its leasehold rental consequently ceased.

The greater part of the decrease in fixed charges compared with 1910, is due to the payment at maturity, in that year, of the General Mortgage Bonds and Short Term Notes referred to in the last annual report.

After meeting all liabilities, including the necessary payments to the Sinking Funds, the net income for the year was $37,318,351.05. The decrease in this item of only $457,133.03, compared with 1910, is due to the saving resulting from the retirement of your fixed obligations, as explained in the preceding paragraph, which was effected through the issue of capital stock. Out of the net income remaining, $319,756.11 was contributed to the Trust Fund of October, 1878, and dividends of 6 per cent. were paid aggregating $25,950,857.25, leaving a balance of $11,047,737.69, a decrease of $2,008,364.35, compared with 1910. Car Trust Principal payments of $3,076,853.00; Extraordinary Expenditures of $2,265,887.29 were also made, and $4,000,000.00 transferred to the Reserve for Additions and Betterments to provide such additions and betterments as in the judgment of the management should not be charged to Capital Account, and the remaining balance of Net Income $1,704,997.40, was credited to Profit and Loss.

There were charged against Profit and Loss Account advances to branch and affiliated companies, as hereinafter stated, which with adjustments made to sundry accounts, aggregated $1,351,651.04, leaving the balance to the credit of Profit and Loss on December 31st, 1911, $27,397,808.16.

As foreshadowed in the report for the year 1910, an allotment of ten per centum of capital stock, at par, was made to stockholders of record May 5th, 1911, and was fully subscribed for, realizing at par $41,261,600.

The expenditures on road and equipment, during the year, consisted of the following:—

Additional property for enlargement and improvement of the freight station facilities at Norristown, Lancaster, Harrisburg, and Uniontown, and for the abolition of grade crossings hereinafter mentioned.

Right of way for small branch lines in the bituminous coal regions.

Awards under right of way condemnation proceedings on the Darby Creek Low Grade Line between Philadelphia and Paoli, and purchase of additional right of way between Colonia and Waverly, New Jersey, the eastern section of the relief line between Morrisville, Pa., and Newark, N. J.

Considerable progress was made in the rebuilding of the Cortlandt Street Ferry, New York City, which will probably be completed in 1912.

The new four-track elevated line and passenger station at Bristol, mentioned in the last annual report, were completed and put in service during the year, and all main line grade crossings in that city were thereby eliminated.

The Newark Rapid Transit Line, described in the annual report for 1910, which provides a frequent multiple unit electric service to and from the Hudson Terminal, Cortlandt and Church Streets, New York, via Manhattan Transfer Station to Park Place, Newark, New Jersey, was completed and placed in operation November 26th, 1911.

The construction of the eastern section of the six-track system between Morrisville, Pennsylvania, and Newark, New Jersey, was undertaken by beginning the construction of two additional tracks adjoining the present four-track main line from Colonia to Bay Way, West of Elizabeth, including the elevation of the existing main line tracks through Rahway. The extension of the six-track system through Elizabeth to Waverly, including line and station improvements, will be carried forward when the necessary municipal authority has been obtained.

Grade crossings at Coatesville, Christiana, Jeannette, Trafford, and at Lambert Street, Pittsburgh, were abolished by the construction of undergrade bridges.

A new freight transfer station was constructed during the year at Harrisburg for the purpose of facilitiating the movement of merchandise freight and increasing carloading.

Considerable extensions to the various car shops and additions to the tools and machinery were made during the year.

The improvements at Greensburg, including a new passenger station and the revision of grade and completion of the four-track system, mentioned in the last annual report, were practically completed during the year.

The change of grade and extension of the track facilities in West Brownsville Yard, to reach the elevation of the new double track Monongahela River bridge at that point, were begun during the year, and contracts have been awarded for the construction of the bridge, to replace the present single track bridge.

The Northumberland Classification Yard, also mentioned in the last annual report, jointly owned by this Company and the Northern Central Railway Company, was completed during the year and placed in operation.

The construction of a sixteen-span, double-track steel bridge over the West Branch of the Susquehanna River at Montgomery, to replace the present single-track bridge at that point, was authorized and begun during the year.

The aggregate expenditures made by the company for construction and equipment during the year on its owned lines and those of the Harrisburg, Portsmouth, Mt. Joy and Lancaster Railroad Company and United New Jersey Railroad and Canal Company, operated under long term leases, comprising the main line system between New York and Pittsburgh (including $599,363.01 on account of water trust certificates), were $14,319,530.65.

This sum was disposed of as follows:—

Charge to Reserve for Additions and Betterments appropriated out of Income of previous years	$4,700,000.00	
Charged to Income for the year 1911	2,265,887.29	
		$6,965,887.29
Provided out of Equipment Depreciation Reserve		1,792,687.24
Charged to Capital Account:—		
Road	$1,889,499.17	
Equipment	3,671,456.95	
		5,560,956.12
Total		$14,319,530.65

The charges to Capital Account were further increased $482,054.88 by the absorption of the Ridgway and Clearfield Railroad, making the total charges to that account for the year, $6,043,011.

Under the Balance Sheet prescribed by the Interstate Commerce Commission, the Road and Equipment Account includes not only these capital charges, but also similar expenditures made out of Income since June 30th, 1907, on the roads embraced in the Balance Sheet. Therefore, of the foregoing $6,965,887.29, Income expenditures not properly chargeable to capital account $3,040,229.03 on the lines owned, and on the Harrisburg, Portsmouth, Mt. Joy and Lancaster Railroad Company, have been so included in the Road and Equipment Account for the year 1911, but the balance of $3,326,295.25, leasehold expenditures for the United New Jersey Railroad and Canal Company, and $599,363.01 for water supply Trust Certificates are accounts not dealt with in the Balance Sheet of this Company.

An offsetting liability appears on the credit side of the Balance Sheet, entitled "Additions to Property since June 30th, 1907, through Income," in which is carried not only $3,040,229.03, but also the payments through Income on account of Car Trust Certificates amounting to $3,076,853.00 for 1911, and $637,644.07 for previous years, aggregating $6,754,726.10.

There is also included in the General Balance Sheet, in the Cost of Equipment, $1,792,687.24, covering the net expenditures for equipment purchased during the year 1911 out of the Reserve for Accrued Depreciation of Equipment, established under the regulations of the Interstate Commerce Commission. From the total cost of equipment is also deducted the Reserve for Accrued Depreciation of Equipment, $10,489,877.77, so that the net book value of the equipment can be ascertained.

The accrued depreciation can be reduced only to the extent of the original cost of any equipment retired, but as the original cost is not sufficient to replace the retired equipment and provide for the accrued depreciation, the Company, in conformity with its established practice, will maintain the standard and value of its equipment, and the amount which remained unapplied, December 31st, 1911, viz: $4,290,028.35, will be spent for equipment ordered but not yet received.

The improvement of the Company's passenger facilities in the City of Philadelphia, the necessity for which was explained in the last annual report, has been given most careful consideration during the year, and the Board of Directors have about concluded that it should be accomplished by increasing the tracks and platforms and enlarging the station facilities at Broad Street Station and North Philadelphia Station.

Consideration is also being given to the separation of through and local train traffic at Broad Street Station, and whether the electrification of some of its suburban lines would not afford material relief at that terminal. This decision will be announced when the studies now being made by the experts have been concluded.

The principal construction work on the other lines in which this Company is interested was as follows:—

On the Northern Central Railway in Baltimore, the construction of the new passenger station and the enlargement of facilities and re-arrangement of tracks, were practically all completed during the year, as well as the Orangeville round house, which was paid for jointly by the Philadelphia, Baltimore and Washington Railroad and the Northern Central Railway Companies. The old round house at Mt. Vernon Yard was abandoned and the service is now performed at Orangeville.

There is practically no change to report in the status of the proposed lease by this Company of the railroad, property and franchises of the Northern Central Railway Company, which was fully explained in the report for 1910. The lease has been duly authorized by both companies and approved by the Public Service Commission of Maryland, and, but for the impediment occasioned by impending litigation, instituted by a small number of minority stockholders, in the United States Circuit Court for the Eastern District of Pennsylvania and for the District of Maryland, respectively, said lease would have been promptly executed and delivered. Under its provisions the lease and the rental payments became effective January 1st, 1911, and therefore when the lease is fully executed and delivered, it will necessitate a just and equitable accounting between the lessor and the lessee, in such manner as will properly protect and preserve the rights and interests of each party in conformity with its terms and conditions.

Expenditures have been made by the Philadelphia, Baltimore and Washington Railroad for the extension of the four-track system at various points, and the construction of a car load delivery yard at New Jersey Avenue, Washington, D. C.

On the Delaware Railroad, a new station was constructed at Dover, Delaware, and the second track extended from Broad Creek to Laurel.

The Pennsylvania Tunnel and Terminal Railroad Company has issued its certificate of indebtedness for $84,861,420.44, to this Company in settlement for the construction of the New York Tunnel Extension and Station, including $1,896,004.92 advanced to that Company during the year 1911, for the completion of its railroad. This certificate, and $15,000,000. of its full paid Capital Stock, are included in the detailed List of Securities owned by this Company, and are carried on the Balance Sheet at valuations respectively of $57,461,419.44 and $1. The balance of its Capital Stock, namely, $10,000,000., is owned by the Pennsylvania Company. The results of funding this indebtedness is reflected in the General Balance Sheet.

The Company during the year made further advances, aggregating $4,531,000.00, to the Long Island Railroad Company for the improvement of its railroad and facilities and the construction of new lines and equipment, and will receive in payment therefor a four per cent. debenture of that Company.

In pursuance of action taken at last annual meeting of the stockholders, the Ridgway and Clearfield Railroad, whose capital stock had been previously owned and its road operated by this Company, was absorbed by and became part of The Pennsylvania Railroad on April 1st, 1911.

Effective May 1st, 1911, the Bedford and Bridgeport Railway Company and the Bedford and Hollidaysburg Railroad Company, two branch lines of the system, in central Pennsylvania, were merged and now constitute the Hollidaysburg, Bedford and Cumberland Railroad Company.

On the Cambria and Clearfield Railway, the construction of the Bear Run Branch was begun and it will be completed in 1912. The Burley Branch was completed during the year and the telephone system for train dispatching on the Bellwood Division was also placed in operation. This Company advanced $352,088.22 to meet these and other construction expenditures which the Cambria and Clearfield Railway Company could not pay, and charged the amount against Profit and Loss Account.

The work of improving the grade and alignment on the Western New York and Pennsylvania Railway, mentioned in the last annual report, was continued during the year. To meet its construction and equipment expenditures for the year, advances aggregating $888,790.81 were made by this Company to the Western New York and Pennsylvania Railway Company, which is substantially owned by and is leased to this Company, and that Company being unable to pay the same, this amount was charged against the Profit and Loss Account.

This Company has received a note for $107,111.28, from the New York Connecting Railroad Company to cover advances made to the latter, during the year, for construction and right-of-way expenditures.

The New York Connecting Railroad Company—the capital stock of which has been owned for many years one-half each by this Company and the New York, New Haven and Hartford Railroad Company—is constructing a railroad from a connection with the Long Island Railroad, near the boundary line between the Boroughs of Brooklyn and Queens, New York City, through the latter Borough to and over the East River and Randall's and Wards Islands, to a connection with the New York, New Haven and Hartford Railroad near Port Morris, in the Borough of Bronx, and also a connection from said main line to the New York Tunnel Extension in Sunnyside Yard, Long Island City. Contracts have been awarded for the steel work for the East River Bridge, and its viaducts and approaches, on the north into Bronx Borough, and on the south into the Borough of Queens, Long Island.

Upon the completion of the railroad, and the exercise of trackage rights to be obtained from the Long Island Railroad Company between the said connection and its Bay Ridge terminals on New York Harbor, the freight traffic interchanged between the Pennsylvania and New Haven Systems, now transported by floats between the Pennsylvania terminals on the west side of the Hudson River and the New York, New Haven and Hartford Railroad Company's lines at Port Morris—a distance of about 14 miles—will be floated from Greenville, New Jersey, to Bay Ridge, Long Island—a distance of about 3½ miles—and thence moved by rail to Port Morris. The connection with the Tunnel Extension will permit a direct all-rail movement via the Pennsylvania Station, New York City, for the passenger traffic interchanged between the two systems. The New York Connecting route will materially increase the facilities for, and expedite the movement of, the New England passenger and freight traffic, and will avoid congestion of the New York Terminals and Harbor, and the delays which often arise in float service due to fog, ice, tides and the crowded conditions of the Hudson and East Rivers.

About three years will be required to construct the New York Connecting Railroad, including its East River Bridge and Viaducts, and the cost thereof—estimated at about $15,000,000, in addition to the $5,000,000. previously advanced in equal amounts by the two Owning Companies and represented by its capital stock and notes,—will be provided for through an issue of its securities. The principal and interest of these securities will be guaranteed by this Company and the New York, New Haven and Hartford Railroad Company, and the line operated pursuant to an agreement between the two Companies, under which they will participate in its profits, or meet its deficits.

The securities held by the Company, December 31st, 1911, at a valuation of $321,540,716.02, produced a direct income during the year of $14,450,593.95.

Under the provisions of the Pension Department the following officers were retired:—

Chas. E. Pugh, First Vice-President, on February 28th, 1911, after a service of fifty-two years, the last eighteen as a Vice-President; Theodore N. Ely, Chief of Motive Power, June 30th, 1911, after forty-three years' service, and Geo. V. Massey, General Counsel, December 31st, 1911, after thirty-five years' service.

These Officers carry with them the best wishes of the Board and their associates, that, after such faithful and able service, so fully appreciated by the Board and so well known to the Stockholders, they may enjoy for many years a well-earned relaxation from their arduous duties and responsibilities.

By order of the Board,

JAMES McCREA,
President.

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LEWIS NEILSON, SECRETARY,
BROAD STREET STATION, PHILADELPHIA, PA.